CADKEY

DataCAD®

Version 5

Getting Started Manual

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DataCAD ® Version 5
Getting Started Manual

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1

Before You Begin

Overview

DataCAD is a powerful computer-aided design (CAD) system specifically developed for architectural, engineering, and construction applications. Combining automated drawing capabilities with the power and flexibility of microcomputer technology, DataCAD delivers the most advanced drafting, design, and database capabilities available. From 2-D drawings to 3-D modeling, DataCAD offers a professional and affordable solution to your designing needs.

A user-oriented menu system makes DataCAD easy to learn and use. Because it was developed by architects, the structure of the program focuses on design, not computer technology. Even draftsmen and designers with no previous computer experience can learn DataCAD quickly and easily.

From your initial design work, massing studies, and interior perspectives, to your final set of working drawings, DataCAD provides you with the tools you need to produce quality work quickly, accurately, and with greater flexibility than ever before.

About This Chapter

This chapter describes what you need to know before you install, configure, and start working with DataCAD. This chapter includes:

- A description of what's in each chapter of the *DataCAD Getting Started Manual.*
- Information about notational conventions used in the manuals.
- Package inventory for both new and upgrade users.
- System requirements for DataCAD.

About the Manual

The *DataCAD Getting Started Manual* describes how to install, configure, start, and exit DataCAD. The manual also contains information about the organization of the DataCAD system along with helpful information about using DataCAD to plan projects effectively and efficiently. The *DataCAD Getting Started Manual* contains the following chapters:

Chapter Name	What You Learn
Installation	Instructions for running the Installation program to copy DataCAD to your hard drive.
Configuration	Instructions for running the configuration program to customize DataCAD to work on your equipment. A detailed description of the configuration options is provided.
System Structure	How to start the DataCAD program and load new or existing drawing files.
Organizing a Drawing on DataCAD	How to produce individual drawing files on a single workstation.
Hardware Setup	Specific configuration information for plotters.
Appendix	Common questions that arise when using DataCAD and answers.

Notation

The *DataCAD Getting Started Manual* uses different notations to make it easy for you to spot important information. The following section describes the notations.

Italics

Italics shows you that a definition follows the italicized word. The manual contains *italics* to bring important information to your attention. Also, the names of other manuals in DataCAD's printed documentation appear in italics, such as *DataCAD Reference Manual.*

C:\DCAD5

The documentation uses c:\dcad5 as the name for the directory in which you store DataCAD. You can name this directory anything you want. If you use a different name, just substitute that name for c:\dcad5.

[↵]

This symbol, [↵], means press the Enter key.

Numbered Steps

Procedures that you need to follow in order appear in numbered steps.

Bulleted Lists

Checklists or information that you need to know before starting a procedure appear in bulleted lists, as in this example:

- Registration card.
- Information on CADKEY products and training.
- Technical Support Hotline Information card.

Options

The names of DataCAD options appear in a different typeface and look like this example: Invert.

[Key]-[Key]

Press both keys at the same time, such as [Alt]-[U].

Package Inventory

The checklist below describes package contents for new and upgrade DataCAD users. If your package is incomplete, call CADKEY Customer Service at (203) 298-8888.

Your DataCAD package contains:

- *DataCAD Getting Started Manual.*
- *DataCAD Reference Manual.*
- *DataCAD Desktop Tools Manual.*
- *Mastering DataCAD.*
- *DataCAD Quick Reference Card.*
- DataCAD Version 5 distribution media.

  Be sure to read the License Agreement before installing the program.
- Registration card.
- Information on CADKEY products and training.
- Supported hardware list.

System Requirements

The following list specifies the system requirements for DataCAD.

Requirement	**Description**
Computer and Disk Setup	Any IBM-compatible 80386 or 80486 CPU-based computer with a hard disk drive and a high density floppy disk drive. Also, a serial port for a mouse and a parallel port for a plotter.
Math Coprocessor	Intel™ 80387 or 80487 for 486SX chips.
Hard Disk Free Space	Minimum of 40MB free disk space.
Memory	640KB RAM with at least 4MB of expanded memory.
Operating System	DOS Version 5.0 or higher. *Files=20* and *Buffers=15* in config.sys.
Graphics Display Card and Monitor	A DataCAD-supported graphics card and monitor.

2

Installation

Overview

This chapter describes how to install DataCAD. The DataCAD installation program guides you step-by-step through installing DataCAD. All of the information you need appears on text screens throughout the program. Read each screen carefully and follow all screen prompts.

The DataCAD installation program:

- Creates a subdirectory in which to store DataCAD.
- Creates a subdirectory structure and establishes path settings for all required file types (drawing files, template and symbol files, etc.).
- Installs DataCAD, DCAL, Velocity, DC Print, and DCAD_AEC Templates and Symbols.
- Allows you to install all of the programs listed above or any combination of them. You may select either a partial or a total installation.

Installation Guidelines

Information and instructions in this chapter are based on the assumption that you have a working knowledge of DOS (Disk Operating System) and an understanding of the basic design and operation of your hardware.

- Read the "Before You Begin" chapter in this book.
- View the readme.doc file found on DataCAD's disk #1. It contains important information about DataCAD. Insert disk #1 in drive A, type **type a:readme.doc**, and press ↵.
- For the proper operation of the installation program, make sure the existing config.sys file in your root directory includes the statements: Files=40 and Buffers=15. If necessary, use a text editor to modify config.sys.
- Do not load any memory-resident programs such as calendars and communication programs during installation. After you have installed, configured, and run DataCAD you can experiment with memory-resident programs to check on their compatibility.
- Back up all the DataCAD program disks before you install DataCAD and store the backups in a safe place. Refer to your DOS manual for instructions on how to create backup copies of disks.

What You Need to Know

The installation program lists the amount of required hard disk space, in megabytes, for each of the installation options. Before installing DataCAD, use the DOS chkdsk or dir commands to determine the amount of hard disk space that you have available. The installation program asks you questions about:

- The drive on which you wish to install DataCAD.
- The name of the DataCAD directory, \dcad5, is the default setting.
- The graphics card driver which you want to install.
- Which program(s) you want to install; you can install DataCAD, DCAL, Velocity, DC Print, DCAD_AEC Templates and Symbols, or everything.

✏

Note that the installation program provides a number of options for partial installation. You might want to install just DataCAD now, and then install the other files as you need them.

Upgrading to a New Version

If you are upgrading from an earlier version of DataCAD, make sure you make a backup copy of all of your DataCAD files. This includes the executable and support files in addition to drawing files, layer files, template files, and symbol files. If you elect to install DataCAD in the same subdirectory in which the earlier version is located, existing files will be overwritten.

The installation of the new DataCAD disks erases your current configuration settings. Take a minute to run your current configuration program and copy the settings for your display device, software display list, and plotter, as well as the current pathnames for your DataCAD files. This will allow you to reset your existing settings to the new version of DataCAD.

Installation of the new version of DataCAD in your current directory structure overwrites a number of support and default files which you (or a third-party macro) may have customized. To retain any of these files for use after upgrading, copy them to a floppy disk *before* installing the upgrade. *After* upgrading, make a backup copy of the new contents of the \dcad5\sup subdirectory. Then you can copy customized files from the earlier version from the floppy disk to the appropriate (new version) subdirectories.

The files that you should consider saving are located in the subdirectories specified in your current configuration for support files and default files. The files, normally found in the \dcad5\sup subdirectory, include:

Files	Description
.ang	Default angle values.
.dis	Default distance values.
.scl	Default scale values.

There may be a number of files with the above listed file extensions; save all of them.

dcad.lin	Line type definitions.
dcad.mcr	Keyboard macros.
dcad.pat	Hatch patterns.

You, or a third-party macro that you use, may have customized one or all of the three files listed above. You, or a macro, might utilize different versions of them for different purposes. These three files, and any variations that are used, should be saved. Note that, because some menu locations have changed in the new version of DataCAD, your customized keyboard macro file may not operate as you expect it to. You should check it carefully after copying it into the new version of DataCAD.

dcad.stl Text style definitions.

If you have defined and saved any text styles, save this file and reload it after installing the upgrade.

✱ If you have modified or created anything, you should not install the Templates and Symbols supplied with the DCAD_AEC macro. Your modifications will be overwritten.

Remember to keep the following in mind when upgrading to a new version:

- This version of DataCAD accesses your mouse *through the driver supplied with your mouse*. You no longer select a Cadkey-supplied mouse driver in the configuration menu. Before entering DataCAD, you need to initiate your mouse at the DOS prompt, typically by including the mouse.com command in your autoexec.bat file.
- To run the Quick Shader, a driver must be loaded from the DOS command line, and you need to provide *expanded memory* for use in Quick Shader processing. These requirements, and their configuration, are similar to those for the software display list. You use your expanded memory manager to configure an amount of physical RAM as expanded memory (2MB recommended for the Quick Shader) and load the Quick Shader driver at the DOS prompt with rundcad.bat.
- Since you may configure as many as three output devices, which are accessed through the Plot menu in DataCAD, you need to know the configuration parameters for each device.

Installing DataCAD

This section provides the instructions for installing DataCAD on your hard drive. The installation program creates directories to store the DataCAD program files and copies these files to the correct directories.

How to Install DataCAD

Follow these instructions to install DataCAD:

1. Put DataCAD disk 1 into drive A. Type **a:** and press [↵].

   A:> appears on the screen.

   To install DataCAD from another floppy drive, just substitute that drive letter for A.

2. Type **install** and press [↵].

   The Installation Title Screen appears.

3. Press any key to continue.

   An installation information screen appears that tells you about the installation program. The computer reads the information on the disk and asks you to select the type of installation from the menu.

   To cancel the installation at any time, press [Esc] to return to the DOS prompt.

4. Type the drive letter where you plan to insert the DataCAD disks:

   If disk #1 is in drive A, press [↵]. If disk #1 is in drive B, type **b** and press [↵].

5. Press [↵] to accept the default directory, \dcad5.

   or

   Type the name of the directory to which you want to copy your DataCAD program files.

6. The installation program lists the names of the directories that it creates. Either:

   - ☐ Accept the directories as displayed by typing **c**, or just press ↵.

   - ☐ Change the name of the installation directory by typing **d**. The installation directory is the main DataCAD directory (\dcad5, if you accepted the default). When you type **d**, you return to Step 5.

   If you have specified that you want to install DCAL, Velocity, DC Print, and/or the DCAD_AEC Templates and Symbols, the installation program prompts you for the subdirectories to which they should be installed. As with the DataCAD installation, you may accept the default subdirectory or specify a different one for each.

7. The installation program prompts you for the name of the graphics driver to install. Follow the instructions provided on this screen to select the correct driver for your system. If you do not select a driver, the program installs ibmvgasm.exe.

8. The installation program now prompts you to insert the required disks into the floppy drive. After you insert the correct disk, type **c** to continue.

9. When the installation procedure is complete, the program enters the configuration program.

   Before you can start DataCAD, you must configure the program for your particular system. This procedure includes understanding the concept of drivers and running the configuration program to customize DataCAD for your equipment; see the "Configuration" chapter for detailed information.

10. When you exit the configuration program, the installation program returns to the system prompt.

You can cancel the installation program and return to the system prompt by typing **x** whenever you are prompted for a new disk. You may also press Esc at any time during the installation procedure to abort the current process.

DataCAD Directory Tree

When you install DataCAD, the installation program automatically creates subdirectories in which to store different types of files. The following shows the DataCAD default directory tree, with a brief description of the contents of each subdirectory:

ROOT

\dcad5	Main DataCAD directory; DataCAD executable, overlay, and configuration files; DC Print executable, if installed.

\chr	Text font files.
\dcp	Data files for DC Print, if installed.
\dcx	DCAL macro files.
\drv	Driver files (graphics card, digitizer, plotter).
\dwg	Drawing files.
\frm	Template report form files.
\lyr	Layer files.
\sup	Support and default files.
\fontpof	Text font .pof files.
\hatchpof	Hatch pattern .pof files.
\linepof	Line type .pof files.
\sym	Symbol files in \sym subdirectories.
\tpl	Template files.

Velocity Directory Tree

When you install Velocity, the installation program automatically creates subdirectories in which to store different types of files. The follow shows the Velocity default directory tree, with a brief description of the contents of each subdirectory:

ROOT

\velocity velos		Velocity executable and configuration files, conversion utility files.
	\atr	Attribute files.
	\drn	.drn intermediate rendering files.
	\drv	Graphics drivers for Velocity.
	\img	.2rn and .6rn Velocity-rendered image files.
	\vau	Support files.
	\vtm	Working directory for temporary files created by Velocity during the rendering process.

3

Configuration

Overview

This chapter explains how to configure DataCAD to work on your system. Topics covered include:

- Configuring DataCAD

  Instructions for running the configuration program to customize DataCAD to work on your system. A detailed description of the configuration options is provided.

- Starting DataCAD

  Instructions for starting DataCAD from the system prompt as well as a discussion of the Drawing Selection Screen.

- Configuring Velocity
- Advanced Configuration

  A discussion is provided of memory management as it applies to a system configuration for DataCAD. Recommendations for the allocation of system resources to particular DataCAD functions\drivers are made.

DataCAD incorporates a feature which allows you to "shell out" to the DOS command line, suspending the operation of DataCAD. It is possible for you to shell out and enter the configuration program to change settings. Those changes will not take effect until you have exited DataCAD normally and then reentered it.

Configuring DataCAD

This chapter discusses the concept and usage of drivers and explains how to use the configuration program to customize DataCAD to run most efficiently on your hardware.

Drivers are programs used by DataCAD to operate the various devices of your system like graphics cards and printers. Drivers are also used for the operation of two important functions in DataCAD: the software display list and the Quick Shader. Drivers must be loaded before running DataCAD.

You use the configuration program to select specific information, such as the type of display and plotter, that establish the correct interface between DataCAD and your system hardware. You use the configuration program to specify the amount of memory to be used by the software display list. You use it to establish the paths to all of the file types accessed by DataCAD. In addition, the configuration program allows you to customize your screen display and identify default directories for your files. It also creates rundcad.bat which is used to start DataCAD.

✏

If you are upgrading from an earlier version of DataCAD, see the section titled "Upgrading to a New Version" in the "Installation" chapter. It outlines the differences between configuring for this version of DataCAD and earlier ones.

Before You Begin

In order for you to configure your system properly, you must know the following information about your system:

- The amount of available RAM memory.

  To find the amount of available RAM, use the MEM executable program included in DOS version 5.0 or greater. For information on the MEM program check your DOS manual.

  The amount of free conventional memory (below the 640KB barrier) recommended for DataCAD 5 is a minimum of 530KB; the more conventional memory that is available to DataCAD, the more quickly it will operate. See the "System Configuration" and "Advanced Configuration" sections in this chapter for a discussion of this recommendation.

  The amount of expanded memory recommended for the software display list is 1MB.

  The amount of expanded memory recommended for the Quick Shader is 2MB.

- The make and model of your graphics card.

  Note that for some types of graphics cards, you need to utilize a vendor-supplied driver to place them in the correct display "mode" before they can be accessed by a DataCAD graphics driver. You should check the documentation for your graphics card for the correct method of accomplishing this if you plan to use any of the following drivers: vesa16.exe, vesa256.exe, ckdgis.exe, or cktiga.exe. If you are required to use this type of "mode" command, you should execute it before entering the configuration program or DataCAD. Typically, you should include the command in your autoexec.bat file.

- The manufacturer and model of your plotter and/or printer. For each output device, you should also know the serial port (COM1 or COM2) or parallel port (LPT1) used to attach each device and the baud rate, word size, and parity method used by each device.

- The make and model of your digitizer, if you are installing one. You should also know the serial port (COM1 or COM2) which attaches to the digitizer and the baud rate, word size, and parity method used by your digitizer.

- The RAM disk drive designation, if your system has one, and its size.

System Configuration

As a part of the configuration process, you need to establish settings in your config.sys and autoexec.bat files. These settings control the installation and configuration of TSR drivers which, in turn, manage system resources in a manner which optimizes the performance of DataCAD. As a means of discussing the options available to you, sample autoexec.bat and config.sys files are presented below.

They are based on options provided in MS DOS 6.0. They show a system configuration possible for a system with 8MB of installed RAM and a graphics card running in VESA-compliant mode. They are examples only, intended as guidelines by which you may determine your own settings:

config.sys

```
device=c:\dos\himem.sys
dos=high,umb
device=c:\dos\emm386.exe 3072 ram
files=20
buffers=15
c:\dos\ramdrive.sys 3072 /e
```

autoexec.bat

```
path c:\dos
prompt $p$g
c:\dos\smartdrv 1024
c:\mouse\mouse.com
c:\grcard\vmode vesa
```

The first line in config.sys installs himem.sys, DOS 6.0's extended memory manager. The second line loads a large portion of DOS, itself, into the high DOS memory area (between 640KB and 1024KB). The files and buffers statements establish necessary operational parameters, consistent with DataCAD's requirements.

Emm386.exe does two things. First, it provides access to the computer's high DOS memory; inclusion of the umb statement on the dos=high line facilitates this. In a later step, drivers and TSRs are loaded to this area. Second, the 3072 ram parameter tells emm386.exe to configure 3072k (3MB) of extended memory as *expanded memory*. The expanded memory will be accessed by DataCAD's software display list and the Quick Shader.

The ramdrive.sys line creates a 3072KB (3MB) RAM disk in extended memory. In this example, the path for DataCAD's swap, or virtual, files is set to the RAM disk.

In autoexec.bat, the path and prompt statements are standard ones; note that DataCAD does *not* require any path statement. The smartdrv.exe line installs a 1024KB (1MB) disk cache.

The mouse.com command installs the vendor supplied mouse driver. Vmode vesa is a typical graphics card "mode" command as discussed in the "Before You Begin" chapter; it is TSR-supplied with the graphics card.

The config.sys and autoexec.bat files as listed above initiate a system configuration that provides DataCAD access to the proper amounts and types of memory that will facilitate its operation. However, most of the drivers that have been installed reside in conventional memory (below the 640KB barrier).

Although DataCAD can be run with as little as 530KB of available conventional memory, its performance is greatly enhanced by maximizing the amount of conventional memory available for its execution. To make more conventional memory available to DataCAD, you would run MS DOS 6.0's memmaker command.

Memmaker analyzes your system's config.sys and autoexec.bat files and the TSRs which are loaded by them. It edits your config.sys and autoexec.bat, loading those TSRs to high DOS memory, and freeing conventional memory (for DataCAD's use). The resulting edited files are not shown here as they include memory addresses and other additions to the files which are specific to each individual system.

High quality memory managers are also available from a number of vendors. Qualitas' 386MAX, Helix Software's NetRoom, and Quarterdeck's QEMM-386 are three of the best known ones. Each of these have comprehensive menus, thorough documentation, and strong feature sets.

✎

See the MS DOS 6.0 documentation for complete descriptions of the drivers and utilities discussed above.

See the section "Advanced Configuration" for a discussion of RAM resource allocation and loading the DataCAD graphics, software display list, and Quick Shade drivers to high DOS memory.

About Drivers

Drivers are a special type of software program. They provide an interface between an application, such as DataCAD, and the particular hardware components of any particular system. Generally, drivers are Terminate and Stay Resident (TSR) programs. This means that they are initiated by a command at the DOS prompt, install themselves in memory, and then return control of the computer to the user.

A TSR remains resident in memory and, when a software application (DataCAD in this case) sends an instruction to it, provides a particular service to the application/hardware interface.

✎

In the section titled "Advanced Configuration," the topic of moving TSRs from conventional memory to the high DOS memory area is discussed.

Types of Drivers

There are four types of drivers that are important to DataCAD operation: the graphics driver, the software display list driver, and the Quick Shader driver.

- The graphics driver is used to provide DataCAD with information about the monitor/graphics card you use. Generally, the graphics driver is determined by your monitor/graphics card selection in the Configuration program and is loaded automatically by the DataCAD startup command (rundcad).
- The software display list driver provides DataCAD with information used in display list processing. It is loaded automatically, if needed, by the DataCAD start up command. Display list processing is discussed under the "Display List Configuration" section in this chapter.

- The Quick Shader driver provides DataCAD with information used in the operation of the Quick Shader. It is loaded automatically, if needed, by the DataCAD start up command. Quick Shader processing is discussed under the "Quick Shader Configuration" section of this chapter.
- The digitizer driver is used to provide to DataCAD an interface with your digitizer tablet, if you have one installed.

✎

If you want to use the configuration program to change the text size, you must select the correct graphics driver and load it from the system prompt before entering the configuration program. You can easily modify this portion of your DataCAD configuration after you have had a chance to work with the DataCAD program and know the type of display you want to produce.

Selecting the Correct Graphics Driver

DataCAD provides a graphics driver for each graphics card it supports. A list of graphics cards and their associated drivers is included with your installation package or on the file drivers.doc.

To view the drivers.doc file, follow the steps below:

1. Type **cd\dcad5\drv** and press ↵ to change to your DataCAD drivers directory. Substitute the name of your main DataCAD directory for \dcad5 if you changed the default during installation.
2. Type **type drivers.doc** and press ↵.

   The list of graphics cards and drivers appears on your screen. Use this list to determine the correct graphics driver for your system. You may use the installation program to select and install to your \dcad5\drv subdirectory the correct graphics driver for your system if you have not already done so. See the instructions in the "Installation" chapter to do this.

Loading the Graphics Driver

The steps below explain how to load the graphics driver.

1. Type **cd\dcad5\drv** and press ↵.

   Substitute the name of your main DataCAD directory for dcad5 if it is different.

2. Type **drivername** and press ↵.

   drivername refers to the name of the graphics driver you need to use.

   For example, to load the 256-color VESA driver you would type:

   cd\dcad5\drv and press ↵.
   vesa256 and press ↵.

   When you execute the graphics driver, a message informs you that the driver has been loaded, a list of its graphics modes (resolutions and colors) is displayed, and the command that you would use for removing the driver from memory is displayed.

3. After the graphics driver is loaded, type **cd..** and press ↵ to return to the main DataCAD directory.

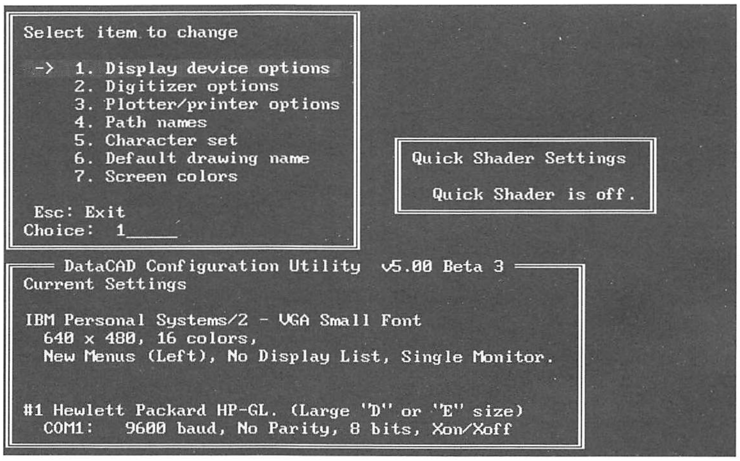
Starting the Configuration Program

After you successfully install DataCAD and load the graphics driver, you can run the configuration program.

From the main DataCAD directory, \dcad5, follow these steps to start the configuration program:

1. Type **config** and press ↵.

The configuration screen appears:



```
Select item to change

 -> 1. Display device options
    2. Digitizer options
    3. Plotter/printer options
    4. Path names
    5. Character set
    6. Default drawing name
    7. Screen colors

 Esc: Exit
Choice:  1_____

                                    Quick Shader Settings

                                      Quick Shader is off.

==== DataCAD Configuration Utility  v5.00 Beta 3 ====
Current Settings

IBM Personal Systems/2 - VGA Small Font
  640 x 480, 16 colors,
  New Menus (Left), No Display List, Single Monitor.

#1 Hewlett Packard HP-GL. (Large 'D" or "E" size)
  COM1:   9600 baud, No Parity, 8 bits, Xon/Xoff
```

Figure 3-1. Configuration screen

The Configuration Program's Screen Display

The configuration program's screen has four sections. The top left section lists the options available for configuring your hardware and selecting operating parameters.

The bottom section displays the current configuration settings. This information will change as you enter information about your equipment.

The top right section displays the current Display List Settings once the software display list has been turned on. If it has not been turned on, this section is not displayed.

The center right section displays the current Quick Shader settings, either on or off.

Selecting Configuration Program Options

There are three ways to select an option.

- Press the number key corresponding to the option you want to select and then press [↵]. For example, to configure your display device, type **1** and press [↵].
- Use the arrow keys to move the highlight bar to the option you want to select and then press [↵].
- To keep the current setting(s) as shown press [↵] or [Esc].

Correcting Input Errors

When you select the wrong information, you can simply choose the menu option again and select the correct information.

The Configuration Screen

The configuration program screen lists the main categories for which configuration information is needed.

Display device options
Digitizer options
Plotter/printer options
Path names
Character set
Default drawing name
Screen colors

✎

If you are upgrading from an earlier version of DataCAD, note that there is *not* an option for configuring a mouse in this version of DataCAD.

This version of DataCAD accesses your mouse *through the driver supplied with the mouse.* You no longer select a Cadkey-supplied mouse driver in the configuration program. Before entering DataCAD, you need to initiate your mouse at the DOS prompt, typically by including the mouse.com command in your autoexec.bat file.

Display Device Options

Use this option to enter information about your graphics card and the way drawings display on the screen.

1. When you select Display Device Options, a submenu containing the following options appears:

   Display device
   Monitor configuration
   Aspect ratio
   Screen resolution
   Text resolution
   Menu configuration
   Display List configuration
   Turn Quick Shader processing ON

2. Select the option you want and press ↵.
3. When you finish entering display device information, press Esc until you return to the configuration program main screen. You can select another configuration option or exit the configuration program from the configuration program main screen.

Display Device

Use Display Device to define the graphics card your system uses. The screen alphabetically lists those graphics cards supported by DataCAD.

1. Use PgDn to advance the screen forward or PgUp key to return to the previous screen until you find the graphics card used by your system.
2. Type the corresponding number or move the highlight bar and press ↵ to select the correct graphics card.

Monitor Configuration

Use this option to indicate whether you use a single or (either of two types of) dual monitor system. In a dual monitor system, the monitor to which DOS boots is regarded as the "main" monitor, the other is the "alternate" monitor. Select the appropriate option for your hardware setup.

1. Type 1, 2, or 3 or move the highlight bar over the correct response.
2. Press ↵.

Aspect Ratio

Aspect Ratio allows you to correct for monitors that do not show squares as square or circles as round.

If you have just installed DataCAD, you will not know if you need to correct the aspect ratio. After you create a drawing, you can check the aspect ratio and return to the configuration program, if necessary, to correct it. To set the correct aspect ratio:

1. Use the DataCAD program to draw a square box of any dimension.
2. With a ruler or scale, measure, in any unit, the width and height of the box on your screen.
3. Return to the configuration program and select Display device options, Aspect Ratio.
4. Type the measured width value and press ↵.
5. Type the measured height value and press ↵.

DataCAD can now adjust the aspect ratio for any discrepancies.

Screen Resolution

Use this option to select the resolution (number of pixels) and the number of colors for your graphics display. These selections are determined by the type of graphics card you use. Note that, for adequate performance of the Quick Shader, you need to select an option that supports 256-color display in DataCAD.

Text Resolution

Use this option to indicate the text size you want displayed on your menu buttons and in the message area of the DataCAD screen. If you see the following warning:

```
Could not access graphics driver. Text choice skipped. Hit any key to continue
```

you tried to access text resolution without loading your graphics driver. Press Esc to return to the configuration program main menu and exit. See "About Drivers" in this chapter for information on selecting and loading the graphics driver. Load the driver and then return to the configuration program to continue configuring your system.

If the menu buttons in DataCAD overlap one another, select a smaller text size in this configuration option.

Menu Configuration

Use this option to select between the three menu configurations:

Old style menus	Note that if you select this option, you will have to adjust the color specified for Text in the Screen Colors menu of the configuration program to a color other than Black.
New style menus	left
New style menus	right

Display List Configuration

The software display list is a technology used by DataCAD to speed its operation. This feature provides rapid panning and zooming capabilities and enhances the selection process in many editing commands in DataCAD. In the display list configuration menus, you specify two things:

- The status of the display list (ON/OFF).
- The location of the display list storage.

When you turn it ON, display list processing requires the use of a TSR driver. This driver (displist.exe) is automatically loaded, when you have configured for it, by the DataCAD start up command (rundcad). The driver creates a "map" of the screen in DataCAD, stores it to the location which you have specified, and accesses the map for many of the viewing and editing operations in DataCAD.

You may specify that the display list storage be located in expanded memory or to disk. When you configure the display list to use EMS, you then designate disk storage as an *overflow* area by specifying the appropriate location for the overflow in the PATHS section of the configuration program. See the sections "System Configuration" and "Advanced Configuration" for discussions of configuring your system for expanded memory.

Hard disk storage is not recommended for display list storage. The relatively slow access time of a hard disk outweighs the performance gains obtained by using the display list. A hard disk subdirectory should be specified, in conjunction with EMS, as the location for display list overflow.

RAM disk storage, either for primary storage of the display list or for its overflow, is not recommended. Conflicts between the display list storage and other data in a RAM disk can lead to unexpected behaviours in DataCAD. If you have sufficient RAM in your system to be tempted to configure some of it as a RAM disk for display list storage, configure it as expanded memory instead.

Selecting Display List Processing

The display list option uses a toggle type of selection method. Either display list processing is ON or OFF. Only the option that can be selected (not currently active) is shown.

When you initially select Display List Configuration, the following message appears:

Turn display list processing ON

This means that the current status of display list processing is OFF and you would select option 1 to turn display list processing ON.

If you do not want to select display list processing, press [Esc] to return to the Display Device menu without changing the current status.

To turn ON display list processing, press 1 and then press [↵]. The following options appear:

Turn display list processing OFF
Amount of EMS space to leave free (in kilobytes)
Amount of disk space to leave free (in kilobytes)

Selecting Expanded Memory

To use expanded memory storage (EMS) space for display list processing, select option 2, from the Select Display List Option screen and press [↵].

The following options appear:

Do not use EMS at all
Use all available EMS
Enter amount of EMS to leave free (in kilobytes)

Use all available EMS is the recommended selection.

To indicate a specific amount of EMS space for DataCAD to use for display list processing, select the third option. Enter the amount of space *to be left free* (for the use of other drivers or applications) in kilobytes (KB) at the prompt. You need to allocate at least 1024KB (1MB) of EMS space for functional display list processing.

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Note that when you enter "the amount of EMS to leave free," you are specifying the amount of expanded memory that the software display list should ***not*** use, that should be reserved for the use of some other application or driver (the Quick Shader, for instance).

For example, if you have configured a total of 3MB of physical RAM as expanded memory, you might wish to allocate 1MB of it to the software display list and 2MB to the Quick Shader. To do so, under the software display list menu "Enter amount of EMS to leave free," you would enter 2048 (KB left free for the Quick Shader).

Selecting Disk Space

As stated above, you should use disk storage for the display list overflow, only. Once you have specified that you will use EMS for display list storage, you use this menu to configure for its overflow (which occurs when the size of the display list exceeds the amount of available expanded memory). To do so, select the third option from the Select Display List Option screen and press ↵. The following options appear:

Do not use disk at all
Use all available disk space
Enter amount of disk to leave free (in kilobytes)

Select the option which meets your processing needs. The option Use all available disk space is the recommended one. To indicate a specific amount of disk space for DataCAD to use for display list overflow, select the third option and enter the amount of space in kilobytes at the prompt.

Press Esc to return to the previous menu until you reach the Display Device menu.

Notes/Restrictions:

When you use disk space for display list overflow, you must also enter the path name for it in the PathNames option.

Below are additional items you can set from within DataCAD to enhance display list performance.

- Set SmallSym and SmallTxt in the Display Menu to 0. This avoids the problem of text and symbols appearing as boxes when you zoom in.
- Set the ArcFactr in the Display menu to a value of 4 or higher. This keeps your arcs and circles smooth when you zoom in.
- Set the WndwSize in the DispList submenu under the Display menu to 4. This sets the display list window to its maximum size.
- Turn off the RgnWarn in the DispList menu if you do not want DataCAD to notify you before each regeneration.
- The U key forces a regeneration of the display list from the database. Esc performs a screen refresh based on what is currently in the display list.

Quick Shader Configuration

The Quick Shader configuration menu allows you to turn on or off the Quick Shader operation in DataCAD. When it is turned on, the Quick Shader driver accesses all available expanded memory for its execution. You must configure at least 2MB of expanded memory for its use.

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While the Quick Shader can be run with a graphics card configured in 16-color mode, the output is unsatisfactory; 256-color display is required for good quality output.

See the sections "System Configuration" and "Advanced Configuration" for a discussion of the system requirements for running the QuickShader.

Digitizer Options

Use this option to enter information about the digitizer tablet you use with DataCAD and the port which attaches to the digitizer.

1. Select Digitizer.

   An options menu appears:

   Select Digitizer
   Port
   Baud Rate
   Word Size
   Parity
   Digitizer Size

2. Select the option you want to change and press ↵.

   See that option below for detailed information. You may need to refer to your digitizer manual for information about the baud rate, word size, and parity method used.

3. When you finish entering information about your digitizer, press Esc until you return to the configuration main menu. You can then select another configuration option or exit the configuration program.

Select Digitizer

This option tells DataCAD the make and model of digitizer you use. A list of digitizers supported by DataCAD appears.

Type the corresponding number or move the highlight bar over the name of the digitizer you use and press ↵.

When you select a digitizer type, DataCAD loads the default settings for baud rate, word size, and parity.

Port

Use Port to indicate the port which attaches to the digitizer, either COM1 or COM2. If the port is not applicable to the selected digitizer, this option will not appear.

Baud Rate

Use Baud Rate to specify the baud rate of the digitizer. Baud Rate is the rate of information transfer between the digitizer and the computer. If the baud rate does not apply to your digitizer selection, this option will not appear.

Word Size

Use Word Size to specify the word size used by the digitizer. Word Size is measured in bits and determines the amount of instructions or information that can be processed at a single time. If word size does not apply to your digitizer selection, this option will not appear.

Parity

Use Parity to indicate whether the digitizer uses a parity bit and if so, whether the parity method is even or odd. The parity method checks the accuracy of the information transfer between the digitizer and the computer. If a parity method does not apply to your digitizer selection, this option will not appear.

Digitizer Size

Digitizer Size is used to indicate the size of the active area of the digitizer tablet. If the size of your tablet is not listed on the screen, select Custom.

To enter the width of digitizer, type the width of your tablet (in inches) and press ↵.

To enter the height of digitizer, type the height of your tablet (in inches) and press ↵.

Plotter/Printer Options

DataCAD requires plotter/printer information in your configuration even if you are not using a plotter or a printer. Leave the default plotter values and press Esc to return to the Configuration main screen.

Use this option to enter information about the plotter(s) and printer(s) you use with DataCAD as well as the port to which each is attached. DataCAD supports as many as three fully configured plotters/printers plus you may designate a port for a local printer.

1. Select Plotter/printer options and press [↵].

   A selection options menu appears:

   Plotter #1
   Plotter #2
   Plotter #3
   Local printer

2. Select the device which you wish to configure.

   An options menu appears:

   Select Plotter
   Port
   Baud Rate
   Word Size
   Parity
   Handshaking

3. Select the option you want to change and press [↵].

   ✎

   Note that, when you select the option for LOCAL PRINTER, you specify the port to which your (PCL) printer is connected (LPT1 or LPT2). This setting is used in the To Paper option of the Pixel Out menu under File I/O in DataCAD.

   You may need to refer to your plotter manual for information about the baud rate, word size, and parity method used.

4. When you finish entering information about your plotter, press [Esc] until you return to the Plotter/printer menu and select another device to configure or continue to press [Esc] until you return to the configuration main menu. You can then select another configuration option or exit the configuration program.

Select Plotter

Use Select Plotter to indicate the make and model of the plotter you are using. A list of plotters supported by DataCAD appears. Type the number corresponding to the plotter type or move the highlight bar over the correct plotter name. Press [↵].

When you select a plotter type, DataCAD loads the default settings for baud rate, word size, and parity.

Port

Use Port to indicate the port to which the plotter attaches:

COM1
COM2
LPT1
LPT2
LPT3
FILE:

The FILE: option allows you to configure a plotter driver to generate a plot file which might be read by some other application. The driver may be one for a plotter which is not connected to your system.

Baud Rate

Use Baud Rate to specify the baud rate of the plotter. Baud Rate is the rate of information transfer between the plotter and the computer.

Word Size

Use Word Size to specify the word size used by the plotter. Word Size is measured in bits and determines the amount of instructions or information that can be processed at a single time.

Parity

Use Parity to indicate whether the plotter uses a parity bit, and if so, whether the parity method is even or odd. The parity method checks the accuracy of the data transfer between the plotter and the computer.

Handshaking

Use Handshaking to select between software (Xon/Xoff) or hardware communication between the plotter/printer and the computer. Handshaking is the method by which the plotter/printer tells the computer whether or not it is ready to receive data.

PathNames

This option allows you to specify or change the path names for all the files generated by DataCAD and for particular types of DataCAD support files. The path indicates the directory where the files will be stored. The path names are initially setup by the installation program.

When you select the PathNames option, a list of the file types generated by DataCAD along with their current path. If a path option is left blank, it means that the files will be stored in your main DataCAD directory, (\dcad5).

To change a path, type the number corresponding to the file type or move the highlight bar over the file type and press ↵. The highlight bar appears over the path name. Type the new path and press ↵.

Note that the configuration program will not allow you to specify a path that does not exist. You must have created the appropriate subdirectory in DOS before entering the configuration program and specifying it in the PathNames option.

The default setting for the Autosave (.asv) files is blank; they will be saved to the \dcad5 directory. It is recommended that you *not* set this path to a RAM disk. In the event of a power failure, you would lose your .asv file if it were located on a RAM disk.

If you selected display list processing using a RAM disk or hard disk from the Display Device Option Menu, you must enter the path to the RAM or hard disk. Select Display List files and type the RAM disk or hard disk path. For example, if your RAM disk is assigned as drive F, type **F:\**.

To return all the pathnames to the DataCAD default values, select Reset to defaults.

When you have finished modifying pathnames, press Esc to return to the Configuration Program main screen.

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Note that the list of path names which you may specify appears on two screens. You move between them using PgUp and PgDn.

Character Set

Use this option to select the default font for drawing text display. You may have to experiment with the different character sets to determine the one you prefer.

To select a character set, type the corresponding number or move the highlight bar over the character set name. Press ↵. To return to the configuration program main menu, press Esc.

Default Drawing Name

Use this option to change the name of your default drawing file. A default drawing file contains the drawing settings for items such as grid size and scale that you use most often. Unless otherwise specified in the DataCAD program, the settings in the default drawing file create the base for any new drawing file you start. If you don't use a default drawing name, DataCAD uses a set of internal default settings. When you enter this menu, the screen displays the following message:

Name of default drawing to use (.dc5): default.dc5

If you accept this setting, whenever you start a new drawing file, DataCAD will search in the subdirectory specified in the paths section of the configuration program for a drawing file named default.dc5.

If you have created a drawing file and saved it to this directory, naming it default.dc5, the new drawing file will be initiated as a copy of default.dc5 and will contain all of the menu settings and any drawing entities placed in default.dc5.

If no file named default.dc5 is found in the specified subdirectory, DataCAD will generate the new drawing file based on its own, internally established default settings.

You may specify any name in this menu for the default drawing file. The conditions stated above for default.dc5 apply no matter what name is specified.

Press [Esc] to return to the Configuration Program main screen.

Screen Colors

Use this option to set the colors used for the various elements of the screen display. You may have to experiment to find the screen color combinations that you like. When you enter the Screen Colors menu, a list of the types of screen items generated during DataCAD processing and their current color status appears. To modify a screen item:

1. Type the corresponding number or move the highlight bar over the item name and press [↵].

   A window appears on the right side of the screen listing the possible choices.

2. Type the number of the color or move the highlight bar over the color name and press [↵].

   Modify other screen items in the same way.

3. To return all the screen items to their initial DataCAD default values, select Reset to defaults.

When you have finished determining your screen colors, press Esc to return to the Configuration Program main screen.

Exiting the Configuration Program

If you are not already there, press Esc until you return to the Configuration Program main screen.

1. Press Esc to exit the configuration program.
2. If you wish to exit the configuration program, select an option:

   - ☐ To save any changes you have made to the configuration, type **1** and press ↵.

     DataCAD updates the configuration file to reflect the new settings and returns to the system prompt. This procedure also creates a file called rundcad.bat, the DataCAD start up command. rundcad.bat loads the appropriate drivers and then removes them when you exit DataCAD.

   - ☐ To exit the configuration program and do not want to save the changes you have made to the configuration, type **2** and press ↵.

     DataCAD will not update the configuration file; nor will it update rundcad.bat. The settings will remain as they were when you entered the configuration program and you return to the system prompt.

3. To return to the Configuration Program main screen without exiting, press Esc. Configuration settings are not updated.

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DataCAD incorporates a feature which allows you to "shell out" to the DOS command line, suspending the operation of DataCAD. It is possible for you to you shell out and enter the configuration program to change settings. Those changes will not take effect until you have exited DataCAD normally and then reentered it.

Configuring Velocity

There are three requirements that must be met before you can run Velocity:

- You must provide expanded memory for its use as a workspace.
- You must load the correct graphics driver for your graphics card.
- You must set an environment variable that allows Velocity to interface with the graphics driver.

If you have configured your system with 3MB of expanded memory for use by the software display list and the Quick Shader, that is a sufficient amount for the operation of Velocity. 1MB of expanded memory is the recommended minimum; if more is available, the performance of Velocity will improve.

The Appendix to the Velocity documentation in the Desktop Tools manual lists the graphics card drivers that are supported by Velocity. For each driver, the settings for the correct environment variable are listed. You must include in your autoexec.bat file the environment variable for your graphics card with the settings appropriate for your system.

For example, to run Velocity with a VESA-compliant graphics card using the vesa256.exe driver on a single monitor system at 1024 x 768 resolution and 256 colors, you would include in autoexec.bat the line:

```
set dc_gdt=vesa256,60,3,0,0,1
```

You also need to load the graphics driver from the DOS command line. You do this by changing to the subdirectory containing the driver and typing **drivername**.

drivername refers to the graphics driver you are using (vesa256 in the above example).

Advanced Configuration

In this section, some guidelines are presented for optimizing the performance of DataCAD. First, the basic operation of DataCAD is briefly described. By understanding how DataCAD works, you may make informed decisions about how to best allocate the system resources that you have available. Second, the use of disk caches and RAM disks is discussed. Third, some recommendations are made for resource allocation on systems with different amounts of available RAM.

Two underlying facts: First, there is no substitute for horsepower; processor type/rating is the single most important factor in DataCAD performance. A Pentium-based system will outperform a 386SX-20, etc. Second, access to data in RAM is accomplished roughly 1,000 times faster than it is to hard disk. The faster your processor and the more that you can configure DataCAD to use RAM resources, the better it will perform.

The three goals you have for configuring DataCAD:

- Maximize application space in conventional memory (number of Page Frames).
- Relieve the processor of some of its tasks.
- Maximize access to the .swp files in RAM, rather than to hard disk.

How DataCAD Works

To understand these goals, a brief explanation of the software's operation is in order. Before you enter DataCAD, the appropriate graphics driver, the software display list driver (if used), and the Quick Shader driver (if used) are installed. This is usually handled by rundcad.bat or a batch file that you have substituted for it. In a configuration that has not been optimized, these drivers are loaded to conventional memory (RAM below the 640KB DOS barrier).

When you invoke the command **dcad**, from the batch file or from the DOS command line, the executable portion of the DataCAD program is loaded to conventional memory. Then, when a drawing file is loaded, it is copied from its hard disk directory and a "working" version of it is made (the drawing swap [.swp] or virtual file]. The location of the .swp files is specified in the path menu of the configuration program under the option for virtual files. At this point, conventional memory contains the core DOS resources, the DataCAD application, and the DataCAD driver(s).

The remaining conventional memory is then taken over by DataCAD for its use. Data is swapped between this area of free conventional memory and the .swp files in 4KB segments, referred to as Page Frames. This swapping action is the means with which DataCAD operates on the data comprising a drawing .swp file. By increasing the size of this "work" space, DataCAD performance can be improved.

DataCAD can function with as few as two Page Frames available, but performance is marginal, at best. To improve performance, you should maximize the amount of conventional memory available for Page Frame swapping. In DataCAD, you can enter the Directry menu and select MemCheck. The message line reads 'Number of Page Frames allocated:___.' Though some users run with fewer than ten Page Frames, 30-40 Pages Frames on 386 and 486 systems is easily achievable and results in better performance.

Maximizing Page Frames

To maximize available Page Frames:

- Use a DOS version (MS DOS 5.0 or higher) which allows a portion of itself to be installed in the high DOS memory area. The result is more free conventional memory for applications.
- Load to high DOS memory all of the drivers utilized in the system configuration.

To load drivers to high memory, you use memory management software. MS DOS versions 5.0 and higher include memory managers; also, a number of excellent third-party products are available. System components whose drivers should be loaded to high DOS memory are listed below. The RAM region, and type, to which their *data* is stored is listed when applicable.

- Software display list driver; display list in expanded memory.
- Graphics card driver.
- Quick Shader driver; application space in expanded memory.
- Mouse driver (vendor supplied).
- Disk cache; cache in extended or expanded memory.
- RAM (or virtual) disk; RAM disk in extended or expanded memory.

When using a memory manager to load drivers high, rundcad.bat should be replaced with a different batch file. DataCAD's configuration program rewrites rundcad.bat every time it is exited (with the Save Changes option selected) and does not recognize the load high statements of memory managers. You should make a copy of rundcad.bat, rename it, and edit it to include the statements for loading the software display list, Quick Shader, and graphics drivers to high memory. Use this alternate batch file to start DataCAD.

Software Display List

You can use the software display list to relieve the processor of some of its tasks. Two notes on its use:

- It is recommended most urgently that you not configure the software display list to hard disk; performance degradation will result from doing this.
- You should not configure the software display list to the same RAM disk to which the .swp files' path are set. The potential for conflicts between the two can lead to disaster. For the same reason, you should not configure the software display list overflow to the same RAM disk as you use for the .swp files. The software display list should be configured to expanded memory for optimal performance.

RAM Disk and Disk Caching

You can maximize access to .swp files in RAM, the third goal for optimizing performance, by using a disk cache and/or a RAM (or virtual) disk. These utilize system RAM to accomplish specific tasks. Each has its own benefits and relative merits depending on the amount of RAM available to the user.

A *disk cache* is a copy in RAM of the information that has been most recently read from the hard disk. When a program calls for information from the hard disk, the cache is read first. If the necessary data is in the cache, it is read directly from RAM and the hard disk is not accessed. If the data is not in the cache, the hard disk is read and the cache is updated with new data. Mostly, disk caches are updated on a 'last in, last out' basis.

A *RAM disk* is a portion of RAM that has been allocated as a logical drive. To DOS, it behaves like a disk drive (or a logical partition of one).

Drivers for disk caches and RAM disks are installed by adding statements to config.sys and/or autoexec.bat, in which they should be loaded to high DOS memory using memory manager commands. Disk caching software can usually be turned on and off (once installed) at the DOS command line and may be controlled from batch files.

If both a RAM disk and a disk cache are used, make sure that the cache driver is configured to not read the RAM disk. It would slow the system by filling the cache with information already located in RAM.

.SWP Files Configured to a RAM Disk

As described above, DataCAD operates by making .swp files to and from which data is swapped by the program for its execution. If the .swp files are located on hard disk, the process of reading from and writing to them is slow. If you can locate them in RAM, through one means or another, DataCAD can access them much more quickly.

One means of accomplishing this is for you to install a RAM disk and configure the path for the .swp files to it. For a couple of reasons, you should set the size of a RAM disk used for swap files to be 1.5 to 2 times larger than your largest drawing file; 3MB is a good working size, as a minimum:

- The drawing .swp file may grow to a size much greater than it parent .dc5 file. DataCAD operations which include an Undo feature create buffers of data which enlarge the drawing .swp file. Other operations, as well, expand the size of the drawing .swp file as they execute.
- DataCAD creates more than one .swp file. When a new text font is added to a drawing, the message 'loading font file xx.chr' is displayed; a new .swp file is being created. Each text font used has its own .swp file, equal in size to its parent .chr file.
- The hidden line removal operation creates a .swp file of its own, which can be quite large, depending upon the amount of information being processed.
- RAM disks smaller than 3MB should be used with extreme caution and only with relatively small drawing files.

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When the size of the .swp files exceeds the size of the RAM disk, DataCAD crashes.

A Reminder about RAM Disks and Autosaves

The path that you set for Autosaves should *not* be to a RAM disk. In the event of a power failure, all information on the RAM disk will be lost. When you configure your .swp files to RAM disk, they will be lost when you lose power. Your backup in this situation is your Autosave file. If it has been saved to hard disk, you can restore your work to the state that it was in at the point of the last Autosave. If it has been saved to a RAM disk, all of the work that you did between the time of loading the drawing file and the time of the power failure will have been lost.

Disk Caching

Disk caches are an extremely beneficial tool in all configurations. For systems with less RAM than is adequate for a RAM disk, where the .swp files are configured to hard disk, even a small cache improves DataCAD's performance. A large disk cache can provide substantial benefits.

In addition to caching reads from the .swp files (on hard disk), program support files accessed by the executing portion of the program are cached to RAM once they have been read the first time. This is a must in all configurations. Relatively large disk caches are recommended for all configurations.

System Resource Allocation

How large a RAM disk should you set up? How much RAM should you allocate to disk caching? How much RAM should you configure as expanded memory for the software display list and the Quick Shader?

The answers to these questions depend on your use of DataCAD and the amount of RAM installed on your system.

If you do all of your work in 2-D and will never need to use the Quick Shader, then you do not need to install the Quick Shader driver and you do not need to configure 2MB of RAM for its use.

If the focus of your work is on production drawings, and those drawings get quite large, then use of the software display list is highly recommended. The software display list driver should be loaded and 1MB of expanded memory should be configured for its use.

The following tables list some of the possible allocation strategies, broken down by total installed RAM:

4MB Systems

System Use	Software Display List	Quick Shader	RAM Disk	Disk Cache
Production Drawings	1MB EMS	-	-	2MB
Production and 3-D/Quick Shader	-	2MB EMS	-	1MB

Note that 4MB systems have 3MB of available RAM for allocating to resources. The tradeoff that you make on a 4MB system is between running the Quick Shader and running the software display list. Though you could run both, you would not be able to run a disk cache. The disk cache provides more overall benefit than does the software display list when the Quick Shader is used on a 4MB system. Since you cannot configure a 3MB RAM disk for the .swp files *and* run the software display list and a comfortable disk cache, using a RAM disk is not recommended for a 4MB system.

8MB Systems

System Use	Software Display List	Quick Shader	RAM Disk	Disk Cache
Production Drawings	1MB EMS	-	5MB	1MB
Production and 3-D/Quick Shader	1MB EMS	2MB EMS	3MB	1MB

On 8MB systems, with 7MB of available RAM for allocating to resources, you can configure comfortably for the Quick Shader, the software display list, a RAM disk, and a disk cache. The configuration for production drawings has a 5MB RAM disk, the other has a 3MB RAM disk, which should be sufficient for all but the largest drawing files. Since DataCAD supports drawing file of up to 6MB, care should be taken to not exceed the size of the RAM disks in either of these configurations.

12MB Systems

System Use	Software Display List	Quick Shader	RAM Disk	Disk Cache
Production Drawings	1MB EMS	-	9MB	1MB
Production and 3-D/Quick Shader	1MB EMS	2MB EMS	7MB	1MB

On 12MB systems, with 11MB of available RAM for allocating to resources, the size of the RAM disk for .swp files should be sufficient for all but the very largest drawing files. Note that, in the configuration that includes the Quick Shader, the size of the disk cache remains at 1MB. When you use a RAM disk for the .swp files, the disk cache does not need to be any larger that 1MB; the safety of a larger RAM disk is more a important factor than increased capacity for caching.

Again, the choices that you make for the allocation of your system resources depend upon the amount of installed RAM in your system and the use to which you are putting DataCAD. The tables are presented as general guidelines and as a means of illustrating the types of choices which you must make for your own system.

4

System Structure

Overview

This section describes how to start the DataCAD program and load a new or existing drawing file. You can load the drawing from the system prompt at the same time you start DataCAD or from the Drawing Selection screen once the DataCAD program is loaded.

✎

Substitute the name of your main DataCAD directory for \dcad5 if you changed the default filename.

Starting DataCAD

Use this quick start procedure when you know the name of the drawing file you want to create or edit.

1. At the system prompt type **cd\dcad5** and press ↵.
2. Type **rundcad**, the name of the file you want to use, and press ↵. For example, to load a drawing file named house.dc5, type **rundcad house**.

   ✎

   If the drawing is not in the default subdirectory for drawings, select a new path and set it properly. This subdirectory is set under the Path Names option in the configuration program.

3. Press ↵ to continue. The selected drawing appears. If it is a new drawing, the default grid pattern appears.

Load a Drawing File

Use this procedure when you want to load a new or existing drawing file after starting DataCAD. Existing drawings appear in the menu to the left of the Drawing Selection screen. For instructions on how to display drawings from different subdirectories or create a new subdirectory see the description of the New Path option.

Choose one of the following procedures to load a drawing file:

- Select a drawing from the menu and then either press the function key associated with the drawing name or double click on the drawing file you want.

  DataCAD loads and displays the drawing.

- Type the drawing name. When prompted, type the name of the drawing you want to create or press [↵]. The drawing name can be up to eight characters and can consist of any letters, digits, and characters except for the following:

  ! @ # * + - / \ () [] {} : ; . ,

DataCAD automatically assigns a file extension of .dc5 to the drawing.

New Path Option

New Path displays drawings in a different subdirectory or creates a new subdirectory for drawings.

When you first load DataCAD, only drawing files stored in the drawing files subdirectory will appear. The subdirectory is specified in the configuration program (Path Names/Drawing Files option). The default drawing file subdirectory is \dcad5\dwg. New files are also stored in the drawing files subdirectory.

You may, however, want to have more than one drawing file subdirectory. Suppose several users are designing drawings in DataCAD. It may be useful to store each users' drawings in a separate subdirectory. You might, for example, create two subdirectories subordinate to the main drawing directory: \dcad5\dwg\design1 and \dcad5\dwg\design2. This setup enables you to store designer 1's drawings in the design1 subdirectory and designer 2's drawings in the design2 subdirectory. Use the New Path option to designate which subdirectory will be active.

Directories may contain several different subdirectories. To change to a different subdirectory you must know the directory names leading to the desired subdirectory. This list of directory names (\dcad5\dwg\design1), for example, is the path.

Changing the Drawing File Subdirectory

1. Select New Path.

   The currently selected path appears at the user prompt on the bottom of the screen. Subdirectories in the current directory level appear in the menu to the left of the screen. The double period (..) refers to the previous directory level. ROOT refers to the root directory or system prompt level.

2. Select the desired subdirectory. Continue selecting subdirectory levels until you reach correct path.

3. Once you finish, select Exit, to return to the Drawing Selection screen.

   The drawings contained in the selected path appear.

Creating a New Subdirectory

1. Select New Path.

   The currently selected path appears at the user prompt on the bottom of the screen. Subdirectories in the current directory level appear in the menu to the left of the screen. The double period (..) refers to the previous directory level. ROOT refers to the root directory or system prompt level.

2. If necessary, select the desired subdirectory until you reach the correct subdirectory level.

3. Type the new subdirectory name.

4. Once you finish, select Exit to return to the Drawing Selection screen.

   There are no drawings listed on the Drawing Selection screen when you create a new subdirectory.

Default Option

The Default option specifies a default drawing file for new drawings. A default drawing file is a drawing file which contains predefined information and display settings. When you create a new drawing, the default drawing file is used as a base or template.

Default drawing files have the same form as regular drawing files and use the .dc5 extension. They are stored in a different subdirectory from your drawing files to separate the two types of files and to protect against inadvertent changes to the default files. Unless otherwise noted, DataCAD stores default drawings in dcad5, the main DataCAD subdirectory.

If you do not specify a default drawing file using the Default option, DataCAD uses the default drawing file entered in the Default drawing name option of the configuration program as the default drawing file for new drawings. If there is no default drawing name in the configuration program, DataCAD uses internal default settings for the new drawing.

✎

The development of an office system of default files for different scales and kinds of work can be helpful in the construction of drawings.

Selecting a Default Drawing File

Use this procedure to select a specific default drawing file for a new drawing.

1. Select Default.

   Available default drawing files appear on the left of the screen.

2. Select the default drawing file and press ↵.
3. Type the name of the new drawing file at the prompt and press ↵.

   New drawing files will now use the settings specified in the default file.

Screen Display

This section discusses the organization of a DataCAD screen. Once you press [↵] from the copyright screen, the Drawing Selection screen appears. Although the contents change, the screen design that begins with the Drawing Selection screen remains the same throughout DataCAD's many functions.

The Graphical User Interface has greatly changed with the addition of a Projection and Navigation Pad, buttons for menu selections and a gray background in the menu and status areas. If you prefer the look and feel of the DataCAD 4.06 Graphical User Interface, press [Alt]-[.]. This allows you to use DataCAD 5 but retain the familiar 4.06 interface. The only limitation of this feature is the loss of the Navigation and Projection Pads.

.DC3 allows you to load into DataCAD 5 drawing files created in an earlier version, those in .dc3 format. When this option is toggled on, only those drawing files with the file extension .dc3, and located in the current path will have their names displayed and be available for selection. Once a .dc3 drawing file is loaded into DataCAD 5 and then saved, it is saved as a .dc5 file, which cannot be read by versions of DataCAD prior to 5. The original .dc3 file is not overwritten by this process.

Drawing Window

The Drawing Window, the largest window on the screen, displays drawing contents. Lines, arcs, walls, fixtures, whatever you design appears in the Drawing Window. Although drawings in DataCAD are drawn at full scale in an infinite field, any portion of a drawing can be displayed at any scale for the designer.

Menu Window

The default position of the Menu Window is to the left of the screen. It can also be located on the right of the screen. To move the Menu Window to the right, press [Alt]-[/].

On the Drawing Selection screen, the Menu Window lists the drawings available in the current subdirectory. Once you load a drawing, the Menu Window lists the options in the currently selected menu.

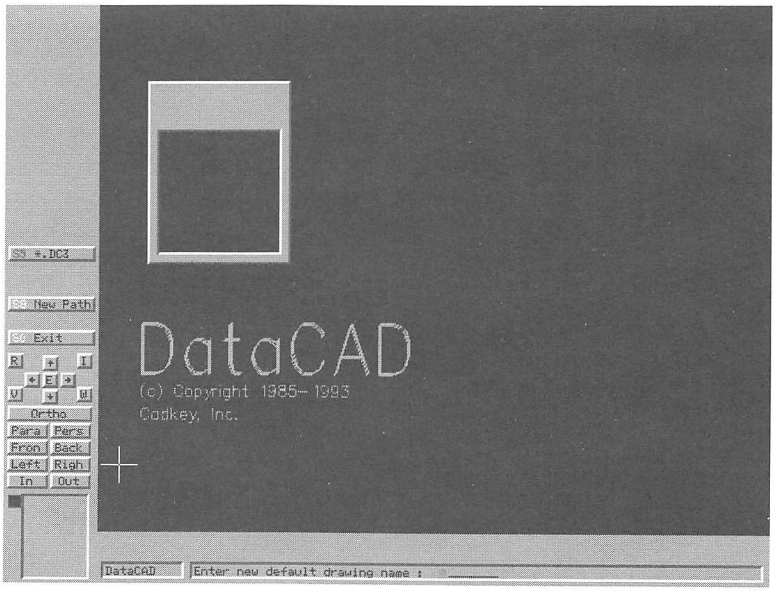
The Status Area is the bottom portion of the Menu Window. When you load a drawing, this area provides information on the current settings. The active layer, the current viewing scale, the active selection set, the current line type and the status of eight important toggle positions all appear in the Status Area.

There are two main menu groups in DataCAD, the Edit menu and the Utility menu. The Edit menu contains all the basic editing functions while the Utility menu contains the display controls. As you move through DataCAD's menu structure, the selections in the Menu Window change to reflect the different commands associated with each option.

To reach the Utility menu from the Edit menu, press :. To reach the Edit menu from the Utility menu, press ;.

Navigation Pad

The Navigation Pad appears in the lower Menu Window. This pad provides an easy way to move your model around the screen, recalculate extents and access the 3DViews, Identify, and WindowIn menus.



```
Enter new default drawing name :
```

Figure 4-1. Navigation and Projection Pads

Navigation Pad Buttons

- **R** Recalculates the extents of a drawing.
- **V** Displays the 3DViews menu.
- **I** Displays the Identify menu.
- **W** Displays the WindowIn menu.
- **E** Displays the drawing at its extents.

The Navigation Pad includes four arrow keys to move the model around the screen. These arrow keys move the model to the:

↑ Bottom of the screen.
↓ Top of the screen.
← Right of the screen.
→ Left of the screen.

You can also use the keyboard arrow keys to move your drawing in the same manner around the screen.

Projection Pad

The Projection Pad is a set of nine buttons located directly under the Navigation Pad. The pad includes buttons for orthographic, parallel, perspective, front, back, left, and right views of your drawing. It also includes In and Out buttons. Use the In and Out buttons to Window In and Window Out of a drawing. With the In button you can display a drawing at a larger scale or size; with the Out button you can display a drawing at a smaller scale or size.

Message Window

The Message Window is located along the bottom of your screen. It displays drawing information, system messages, and user prompts.

When a drawing is loaded, the top line of the Message Window displays the X and Y components, the angle (a), and the distance (d) of the cursor from the last point entered. The values listed can be displayed in architectural, engineering, or metric units.

The middle line of the Message Window displays system and error messages to assist the user.

The bottom line of the Message Window displays any user prompts. This is where you enter data and information for processing. When a drawing is loaded, this line also displays the current active menu.

SWOTHLUD

SWOTHLUD appears at the bottom of the status line. It indicates the status of eight important display settings: Snap Grid, Walls, Ortho Mode, Text, Hatch Marks, Lines, User Lines, and Dimensions. These settings are toggles. When the letter is in uppercase, the feature it represents is active. When the letter is in lowercase, the feature is inactive or an alternate feature is active. Each letter of SWOTHLUD represents a particular feature.

SWOTHLUD settings affect how the drawing is plotted as well as how it appers on the screen. Each setting is described below in both its upper and lower case status. To change settings select the Utility menu/ Display option and then select the option corresponding to the feature you want to change. For example, to toggle text on or off select Utility, Display, and ShowTxt.

S	Snap Grid is on. You can draw entities in specified increments for vertical or horizontal alignment. To change a setting press lower case x.
s	snap Grid is off. You can place entities anywhere on the screen.
W	Walls are drawn. To change a setting press =.
w	walls are not drawn, lines are created instead.
O	Ortho mode (snap angle) is on. You can draw entities in specified angle increments. To change a setting, press upper case O.
o	ortho mode is off. You can draw entities at any angle.
T	Text is shown as boxes on the screen.
t	text is not shown on the plotted drawing.
H	Hatch marks appear.
h	hatch marks do not appear.
L	Lines appear at a specified thickness.
l	lines appear at the same thickness.
U	User lines appear in specified line types, for example, dots, dashes.
u	user lines appear as solids.
D	Dimensions (associative) appear.
d	dimensions (associative) do not appear.

Selecting a Menu Option

You can select Menu Window options with the keyboard or the mouse.

Using the Keyboard

Just to the left of the option names there is a list of letter and number combinations labeled F1 to F0 and S1 to S0. These combinations correspond to the function keys on your keyboard. F1 through F0 correspond to the F1 through F10 function keys. S1 through S0 correspond to Shift plus the F1 through F10 function keys.

To select an option, press the function key associated with the option you want. For example, to select the option associated with F6, press F6. To select the option associated with S4, press Shift-F4.

Using the Mouse

Using the Three-Button Mouse

Use the left mouse button to "pick" points on the screen for lines or walls or to choose an option from the displayed menu.

Use the middle button to "object snap" or grab an object that already exists.

Use the right button to disconnect from a line or to backup one level of the menu structure.

To select an option using a mouse, move the mouse until the cursor highlights the option you want to choose. Press the left button on the mouse to select the option.

Using the Two-Button Mouse

If you have a two-button mouse, the left button is used to "pick," the right button is used to disconnect a line or back up a menu and the letter "n" from the keyboard, n, is used to snap or grab an object.

Concepts

To effectively use DataCAD, you need to understand some of the concepts involved. This section explains some of the basic concepts you will encounter. See "Glossary" in the *DataCAD Reference Manual* for information about terms that are unfamiliar to you.

Area

An area is any part of the drawing within a rectangular window which is temporarily drawn during the selection process. All entities and groups enclosed completely within this rectangular window will be included in the area. All entities and groups partially enclosed or not enclosed within the rectangular window will not be included in the area.

Center

The Home key centers a drawing or view on the screen with one keystroke. To reposition a drawing, move the cursor to the new desired center, and press the Home key.

Change Layer

Tab changes from the active layer to the next layer that is on by scrolling through the list of layers. Shift-Tab scrolls backwards through the list. You can use Tab to draw entities on multiple layers without disconnecting the cursor. After entering the first entity, Tab to the correct layer for the second entity and enter the additional endpoint. DataCAD draws the second entity on the new layer from the second endpoint of the original entity to the specified endpoint. This allows you to draw orthogonal entities in different orientations by setting the grid angle on each layer to reflect each orientation.

Change Scale

PgUp and PgDn change the display scale in specified increments, which default to standard architectural scales. To display a larger portion of a drawing at a smaller scale, press PgUp, to focus on a smaller portion of a drawing, press PgDn.

Change Selection Set

The Alt-1 through Alt-8 keys change the active selection set and enable the user to switch among user-defined sets of entities when editing. While in an edit command, such as Move or Erase, press Alt together with any 1 through 8 key to switch the selection set to edit.

Delete Last Entity

The comma `,` key deletes the last entity.

Delete Last Group

The less than `<` key deletes the last group drawn.

Delete Screen Refresh

`Del` terminates the screen refresh on all layers simultaneously. Any number of entities or groups can be deleted, from the most recent on back.

End Screen Refresh

`End` terminates the screen refresh on the active layer. To terminate the screen refresh on additional layers, press `End` once for each additional layer. `End` does not affect the drawing file, only that portion of it which is displayed. `End` is a particularly useful timesaver when working with large drawing files. Once the portion of the drawing to be edited is redrawn, the screen refresh can be terminated to allow additional editing.

Entity

An entity is a straight or curved geometric element defined by two endpoints. A circle, ellipse, or arc is an entity. A B-Spline or Bezier curve is also an entity. Similarly, a line of text is considered an entity in editing operations. Entities can be edited alone or linked as a group.

Fence

Similar to an area but allowing more flexibility, a fence is any portion of the drawing within a closed polygon which may be temporarily drawn during the selection process. The polygon may be concave or convex and may have up to 36 sides.

Group

A group is a set of entities linked together logically, but not necessarily graphically. The grouping together of entities as groups in DataCAD facilitates editing many related items without affecting other entities in the same portion of a drawing. As groups are also easily redefined, the concept of a group allows the designer to organize a drawing as a series of elements composed of logically-related pieces or entities.

Entities which do not touch may be part of the same group, and entities which are contiguous may be part of different groups. A group may contain any number of entities. Some groups may contain hundreds of entities; other groups may consist of only one entity. Entities are linked as a group in a number of ways. A group of entities drawn in succession without disconnecting the cursor are linked as one group. Similarly a series of lines of text entered at the same time are linked as one group. Any group of entities or groups can be linked with use of the LinkEnts command.

Entities are also linked or associated as one group when they are created at the same time with the Copy command. When an existing entity is edited, with the Change or Move commands, for example, it retains the same group associations.

Keyboard Interrupts

In DataCAD, you can use keyboard interrupts or key combinations to perform as an operation or setting in the middle of another command. When the interrupt function is completed, DataCAD automatically returns to the original function. The specific keyboard interrupt for a function is discussed under individual functions.

Layer

In computer-aided design, layers are the electronic equivalent of overlaid pieces of tracing paper, each containing a small part of the drawing information. By organizing the information displayed on each layer according to type or content, you can perform editing functions on one building component without affecting other components on other layers.

DataCAD allows up to 1000 separate layers in a drawing file. Each layer can be displayed on the monitor individually or in groups to make up the desired display information. Each individual layer can also be saved and loaded into various drawing files.

Ortho Mode

To draw entities at any angle, press [O] to toggle Ortho mode off . To draw entities orthogonal to one another, press [O] again to toggle Ortho mode back on. Ortho mode defaults to drawing entities in 45 degree angle increments to one another. This snap angle can be modified by setting the number of divisions under SnapAng in the Grids menu.

Pan

Drawings can also be repositioned on the screen by using the arrow keys to the right of the keyboard. For example, to pan right, press [→]. The pan distance can be set to any value by using ScrlDist in the Settings menu.

Previous View

Press [P] to restore the previous view and return to the previous scale in one keystroke. DataCAD remembers up to five previous views.

Restore Last Entity or Group

The period key [.] restores the last entity deleted. The greater than key [>] restores the last group. You can restore nly the last deleted entity or group.

Screen Refresh

[Esc] updates or redraws the screen from the drawing file to display the current status of your drawing. This is particularly useful to monitor progress during editing operations.

Scroll Back

The ScrlBack option allows you to see a previously displayed portion of a list.

Scroll Forward

When a list of available choices is too long to fit on a menu, the ScrlFwrd option allows you to see more of the choices available.

Selection Set

A selection set is a user-defined set of entities and/or groups. SelSets provide increased efficiency during editing by reducing the time required to select entities, groups, or define areas or fences to edit. A selection set may contain any number of entities or groups and up to eight different selection sets may be defined. You can only edit active selection sets. Add or remove entities from selection sets with the EditSets command.

Snap Grid

To turn off the snap grid, press lower case x [x]. As [x] is also a toggle, press [x] again to draw entities in specified increments. The default snap grid is 4" by 4", but can be modified along both the X and Y axes by pressing the s key, [s], or by selecting GridSize in the Grids mnu.

Toggles

Some DataCAD options are switches called toggles; they can be toggled on or off. When a toggle is on, the button appears green and when it's off, it appears red.

Undo

To undo an operation or command that you have just performed, choose this option. It appears on the menu only when an action has taken place.

Window In

Objects drawn at full scale in the drawing field can be displayed at different scales for different drawing tasks. To quickly focus on a portion of the drawing for detailed work, press the forward slash key [/] to window in. This brings you to the WindowIn menu.

DataCAD Menus

There are several types of option menus that appear frequently as submenus throughout DataCAD.

Menus

Value Menu

When an option requires you to enter a numerical value, a list of values appears followed by the terms:

Match	To match an existing value, entity, or angle.
Add	To add or subtract one or more values from the list to total the amount you want to enter. To enter the value you want, press ↵. This is a toggle with Subtract.
Clear	To return the value to zero and start again.
To Layer	To put an entity on more than one layer or a different layer than you are currently working on. This is available only when you have more than one layer in the drawing that you are working on.
Undo	To undo the last change you made.
Exit	To return to the previous menu.

The following is a sample Value menu:

1
5
10
20
Add
Clear
Match
Exit

Color Menu

When an option requires you to enter a color, a list of colors appears.

The following is a sample Color menu:

White
Red
Green
Blue
Cyan
Magenta
Brown
Lt Gray
Dk Gray
Lt Grn
Lt Blue
Lt Cyan
Lt Mgta
Yellow
No Change

Line Type Menu

When you select the Line Type option a list of line types available in DataCAD appears along with the ScrlFwrd option. Use ScrlFwrd to continue down the list.

The following is a sample Line Type menu:

Solid
Dotted
Dashed
Dot-Dash
Brick
Box
CentrLin
ElecLine
Grass
GroundLn
Hedge
Insul
LapSidR
PropLine
RigidIns
Section
NextPage
Exit

Move Selection Menu

The Move menu allows you to select a method of moving a portion of a DataCAD drawing.

Entity
Group
Area
Fence
SelSet
LyrSrch
NewDist
Invert
ToLayer
AndCopy
MoveZ
Drag
Undo
Exit

Font Menu

After selecting the option FontName, a list of currently available font types appears. If your font types are located in a directory other than the current path, select NewPath and enter the correct path name.

DataCAD 3-D Menus

3DView Menu

This menu gives you a list of 3-D views available that you can choose for your DataCAD drawing.

A sample would be:

Ortho
Parallel
Prspect
Oblique
Isometric
Elevtion
Control
EditPlne
PlneSnap
SetPersp
WalkThru
SetObliq
GotoView
SaveImag
ClipCube
Globe
WindowIn
Exit

WalkThru Menu

DataCAD has an option that simulates a person walking through or around an object via a series of steps or moves. The WalkThru menu is a list of steps or moves that you may choose.

The following is a sample WalkThru menu:

WalkFwrd
WalkBack
WalkDist
TurnRght
TurnLeft
TurnAngl
StepUp
StepDown
StepLeft
StepRght
StepDist
LookUp
LookDown
LookAngl
AddView
Exit

Drawing Lines

DataCAD is immediately ready to draw lines once you create or load a drawing. Create lines in the following ways.

Using Two Points

1. Move the cursor to the desired location and click on the first endpoint.
2. Move the cursor and click on the second endpoint.
3. Continue drawing lines with steps 1 and 2. Additional lines are drawn from the endpoint of previous lines to the next point entered.
4. Press the right mouse button to disconnect the cursor from the last line entered.

Coordinate Entry Alternatives

DataCAD allows you to draw lines by entering the coordinate locations of the endpoints from the keyboard in any one of the following four coordinate entry methods.

Relative Polar	Defines lines as a distance at a specified angle from the last point picked. This is the default entry method.
Absolute Polar	Defines lines as a distance at a specified angle relative to absolute 0.
Relative Cartesian	Defines lines as increments of x and y relative to the last point picked.
Absolute Cartesian	Defines lines as increments of x and y relative to absolute 0.

To change the coordinate entry method, press Insert until the method you want appears at the bottom of the screen.

Specifying Angles and Distances

The next sections explain the two methods of specifying angles and distances. Try each method.

When in relative polar or absolute polar coordinate entry:

1. Click on the first endpoint of the line.
2. Press Spacebar.
3. Enter the distance from the endpoint just picked to the next endpoint, press ↵.
4. Enter the angle from the first point to the second point, press ↵.
5. Press the right arrow key → to disconnect from the line.

   To continue, press Spacebar and enter the distance and angle to the next point, press ↵.

When in relative cartesian or absolute cartesian coordinate entry:

1. Click on the first endpoint of the line.
2. Press Spacebar.
3. Enter relative or absolute x distance, and press ↵.
4. Enter relative of absolute y distance, and press ↵.

Entering Distances

In the Architectural unit system distances are entered as feet, inches, and fractions of inches. For example:

To enter	Type
4'	4
6"	0.6 or .6
3/16"	0.0.3/16 or ..3/16 or ..3.16
4'6"	4.6
4'6 3/16"	4.6.3/16 or 4.6.3.16

For information on using other unit systems see Scaletype in the Settings menu.

Selecting Distances

The Distance menu appears any time DataCAD expects you to enter a distance. This provides a quick way to enter commonly-used distances. Rather than typing in distances, you can select them from the menu. You can select distances not listed in the menu by selecting combinations of those listed. The sum is displayed on the prompt line but will not be entered until you press ↵ or press the middle mouse button. To subtract an amount from the current total, select Subtract from the menu.

Subsequent selections are subtracted from the running total. To resume adding, select Add. To set the running total to 0, select Clear.

Selecting Angles

The Angle menu appears whenever you should enter an angle. This is a quick way to enter commonly-used angles. Rather than typing in angles you can select them from the menu. You can select angles not listed in the menu by selecting combinations of those listed. The sum appears on the prompt line but is not entered until you press ↵ or press the middle mouse button. To subtract an amount from the current total, select Subtract from the menu. Subsequent selections will be subtracted from the running total. To resume adding, select Add. To set the running total to 0, select Clear. To enter the same angle as that of a line on the screen, select Match, then pick the line on the screen to match.

To enter	**Select/Press**
The same angle	The right button, then the middle mouse button.
The complement of the angle	The right button, then the middle mouse button.
Defaults	The right button, then the middle mouse button.

Entering Angles

In the Relative Polar coordinate system, relative angles are entered as degrees.minutes.seconds.

To enter	**Type**
38°	38
12'	0.12 or .12
30"	0.0.30 or ..30
38° -12'-30"	38.12.30

Defaults

Both Architectural units and Relative Polar coordinates are DataCAD defaults. As the default file is user-definable, DataCAD allows more experienced users to customize the program to reflect specific office practices, or the peculiarities of each job.

File Manipulation

This section discusses how to set up a filing system for the drawings you will produce on DataCAD and how to efficiently manage that system.

DataCAD File Hierarchy

There is a relationship between types of DataCAD files much like the relationship between the trunk and branches of a tree or between the file folder and the contents of the file.

To put it another way, some types of files can only be accessed through other types of files. You must be using a drawing file before you can load any of the template files like dectree.tpl or layer files like dmension.lyr.

Naming Files

You will find that identifying your drawings, templates, and layers with names like "florplan" or "bricks" or "dmension" becomes confusing and redundant: which floor plan? What kind of bricks? Dimensions of what?

Despite the fact that everyone would rather read names than numbers, we believe that a systematic numbering system is the best way to name your files because it eliminates confusion between files and consequently lowers the frustration associated with trying to find a file. How you structure this numbering system is up to you–only you know the specific needs of your office. What we offer below is a typical numbering system which has worked in several architectural offices.

Drawing files can be named by using seven of the eight characters available in a filename prefix, and dividing those seven characters into three groups corresponding to the following information about the file:

- First three characters = Last three digits of office job number
- Next two characters = Letter and number for type of drawing
- Last two characters = Chronological number of drawing

Following is a suggested system for identifying types of architectural drawings. Structural, mechanical, HVAC and civil drawings can be identified by type in a similar fashion:

A0 = General (Index, Symbols, Location Plan, 3D Views)

A1 = Existing and Temporary Conditions, Site Work, Demolition

A2 = Plans, Detail Plans, Roof Plan

A3 = Exterior Elevations, Detail Elevations

A4 = Building Sections, Wall Sections

A5 = Interior Elevations, Toilet Elevations

A6 = Reflected Ceiling Plan, Floor Patterns, Furnishings

A7 = Schedules, Door and Window Types

A8 = Details

A9 = Alternates

For example, if we were about to start drawing the fourth elevation to be produced in job number 85236, the drawing would be named:

236a304.dc5

Naming Layer Files

If you copy a layer out of a drawing file, and store it on the hard disk under its own name, the layer becomes a layer file, and therefore the file needs its own name. To keep track of where the layer came from, we will want the layer file name to be as similar as possible to the name of the drawing file from which it originated. Therefore, a layer uses an eight character file name as follows:

First seven characters = Originating drawing file name

Last character = Chronological letter of layer

For example, if we were to create three separate layer files from the drawing file named 236a304.dc5, the layers would be named, in order of their creation:

236a304a.lyr
236a304b.lyr
236a304c.lyr

Naming Template Files

As you add more and more files to your list of templates, you will begin to develop an office library of predrawn items which can be used in many projects. Saving these as templates makes it easy to reuse them. With templates in particular, it is desirable to retain in the name of the template file a four or five character acronym of an English word, simply because many templates may be used in the course of a drawing, and it is more convenient to scan a list of recognizable words when choosing a template. Therefore one way to index your template files is to use an eight-character filename as follows:

First two characters = Sweet's catalog section number

Next four characters = Four-letter title of template

Last two characters = Chronological number of template

For example, if we were going to create a new template of door jamb details, and three such templates already existed, we might name the fourth template:

08jamb04.tpl

Naming Symbol Files

As you add more and more symbols to each of your template files, you will begin to develop an office library of predrawn items which can be used in many projects. As with templates, it is desirable to retain in the name of the symbol file a four or five character acronym of an English word, because many symbols may be used in the course of a drawing, and it is more convenient to scan a list of recognizable words when choosing a symbol.

Therefore one way to index your symbol files is to use an eight character filename similar to your template file names:

First two characters = Sweet's catalog section number

Next four characters = Four-letter title of symbol

Last two characters = Chronological number of symbol

For example, if we were going to create a new door jamb symbol for the above template of door jamb details, and two such symbols already existed in the template, we might name the third symbol:

08jamb03.sym

File Management

Let's review for a moment our typical office setup. We have provided four independent workstations and a central storage location for floppy disks. We've determined how to keep track of all the files that will be created on the workstations, and we've learned how to copy those files from the workstation hard disk onto floppy disks, so that we can transfer files from workstation to workstation, and make backup copies of files to keep stored in a centrally located "card catalog" of floppy disks.

What have we forgotten? Three things:

- How much information should a drawing file contain? One drawing? One sheet of drawings? Or a complete project?
- How can we be sure that we always have backup copies of every file?
- Since we can copy drawing files, how can we be sure that we don't accidentally have two versions of the same drawing?

Assuming you have an office setup somewhat similar to the one outlined here, and assuming you have devised a system to keep track of your files, such as we have done, then efficient file management can be accomplished by following three simple rules:

- Each drawing file contains only one drawing, unless the project is very small. This allows many people to work on different parts of the same project, and keeps "refresh time" to a minimum.
- All drawings files are stored on floppy disks, so each workstation's hard disk contains only layer and template files–the library of often used items.
- To work on a drawing, a draftsman follows this process:
    1. He takes a floppy disk from the box and copies a drawing file onto his workstation where he makes the necessary changes to the drawing.
    2. When he is finished, he copies the drawing file back to the floppy disk and returns the floppy disk to the box.

       This process is analogous to the familiar office practice of working on different drawings throughout the day by removing them from drawers and taping them down to the drawing board. It also means that there is always a backup copy of the drawing file (on the hard disk of the workstation where the file was last used), but there is only one authorized version of the drawing file (on the floppy disk). So if Bob works on the drawing at his own desk today, but is sick tomorrow, Tom can take the drawing file with Bob's changes to his own desk and keep working on it. When Bob returns, Tom's changes are recorded on the disk which Bob takes to his desk to continue working on.

Making Backups

You should periodically make backup copies of the entire contents of the box of floppy disks. To do this you may want to purchase an external hard drive or make backups onto large-memory tape cartridges to store in a bank vault or other safe location. Otherwise you can simply make a copy of every floppy disk, and store the backup floppies in a safe place. Backup should be done at least once a week to protect the work you have accomplished on your CAD system.

By following the above procedures, each drafter will be creating a backup of each drawing he does on a daily basis.

Locating Files in DataCAD

You know the file is there. It was listed when you typed **dir** at the DOS prompt, but you can not enter it from DataCAD. Check the pathname. The pathname tells DataCAD where to look for your various file types. The pathname for a drawing is an address of sorts. It tells DataCAD how to search your storage device, whether a hard disk, floppy, or tape drive, for the desired file.

Path Names

You can select the path from the menu window or by typing at the prompt in the message window. Refer to "Changing the Drawing File Subdirectory " at the beginning of this chapter.

The pathname is defined from the root directory, denoted in DOS by a backslash (\), from which all other directories branch. The pathname indicates all the intermediate directories between the root directory and the directory containing the file you are looking for. If you used all default directories when you installed DataCAD the pathnames would be:

c:\dcad5	DataCAD files
c:\dcad\dwg	Drawing files (.dc5)
c:\dcad\tpl	Template files (.tpl)
c:\dcad\sym	Symbol files (.sym)

Autosave

At regular intervals, DataCAD automatically saves the additions and changes made to your current drawing to a temporary file. This temporary save file is called an Autosave file or .asv file. This file exists only until you save the drawing.

If, for some reason (like a power failure), you exit DataCAD abnormally without saving your drawing, the .asv file allows you to recover the last autosaved copy of your drawing. You can retrieve the .asv file using the "Save the .asv File" procedure described below.

Save the .asv File

Use this procedure to save the .asv file and rename it as a drawing file.

1. Start DataCAD and load the drawing file. The following message appears:

   An autosave file (.asv) for this drawing is present. Are you sure you want to continue?

2. Select Yes to continue.

   If you select No, DataCAD returns to the system prompt.

3. Select Yes to rename the .asv file.
4. Type a new name for the .asv file. The name must be different from the name of the original drawing file.
5. Press ↵ again to confirm the file rename.

   You now have two copies of the drawing. The file with the new name is the most current. Use the FileI/O, Delete option from the Utility menu if you want to delete the old drawing file.

Delete the .asv File

Use this procedure to delete the .asv file. Changes made during the interrupted work session will be erased. The remaining .dc5 file contains the drawing as of the last time it was permanently saved.

1. Start DataCAD and load the drawing file. The following message appears:

   An autosave file (.asv) for this drawing is present. Are you sure you want to continue?

2. Select Yes to continue.

   Select No to exit DataCAD and return to the system prompt.

3. Select No. The .asv file is deleted and the .dc5 file appears in the Drawing Window.

   The .asv file is created when you see the message Automatic save in progress. This file is different from a backup file (.bak). It is a temporary file that exists only during your work session and does not overwrite or update the current drawing or backup files. This file is for your protection in case you encounter a power or hardware failure. In these instances the automatic save file is saved on your disk with the .asv extension.

   There are two methods to retrieve the automatic save file. This first method is similar to retrieving .bak files.

Method 1

The method to retrieve the automatic save file is to simply re-enter DataCAD. The newest version of DataCAD automatically searches for the existence of an .asv file when loading a drawing file. If an .asv file is present, DataCAD prompts you to rename the file.

Method 2

This method is similar to retrieving .bak files and can be performed by the following steps:

1. Before re-entering DataCAD, change directories to the directory containing your drawing files, a subdirectory named \dcad5\dwg. Type **cd\dcad5\dwg** and press ↵.

2. The most current version of your drawing will reside in a file with a .asv extension. If your drawing file is named facade.dc5, the latest version will be named facade.asv. facade.asv will be current to the last time the drawing was automatically saved.

   To recover facade.asv, type **copy facade.asv facade2.dc5** and press ↵.

   ✎

   It is not necessary to change the name of the file, but giving the file a new name will allow you to use either the latest version, facade2.dc5, or an earlier version, facade.dc5.

3. The last step is change directories to return to dcad5. To change directories, type **cd\dcad5** and press ↵.

   You are now ready to re-enter DataCAD.

Retrieving Backup Files

In addition to Autosave, DataCAD also helps guard against data loss by creating a backup or .bak file. The .bak file created when you open a drawing is a copy of the drawing file changes. In other words, before the .bak file is a replica of the previous version of your drawing file.

Suppose you are unable to load your .dc5 drawing file because of disk failure or corruption or suppose you suddenly find you have made changes to the wrong drawing. By copying the .bak file to the .dc5 file you can recover your previous drawing version and prevent a loss of your work. Below are instructions for retrieving your backup file.

1. Exit DataCAD to the system prompt.
2. Change to the subdirectory where your drawings are stored; the default is \dcad5\dwg.

   To change to this subdirectory type **cd\dcad5\dwg** and press ↵.

   Although your drawing file and your backup file have the same filename, the drawing file has an extension of .dc5 while the backup has an extension of .bak.
3. Use the DOS copy command to copy the .bak file to the .dc5 file.

   For example, if you named your drawing house, the drawing file would be house.dc5 and the backup would be house.bak.

   To perform the copy, type **copy house.bak house.dc5** and press ↵.

   Substitute your filename for house in the example. Your .dc5 file is now the same as your .bak file.
4. To return to the \dcad5 subdirectory, type **cd\dcad5** and press ↵.

   You are now ready to re-enter DataCAD.

Sample Production Tasks

As a project manager you are given a design and production task of a certain scope which must be completed within a given time frame using the available people resources.

- Do you have well-defined responsibilities for each person on the project?
- Who is responsible for drawing organization and sheet layout?
- Who schedules the timing and content of each drawing sheet?
- Do you keep an updated list of who is working on each drawing and the stage of completion for each sheet?
- Do you provide "sepias" of the building layout to your consultants? Are these made before the inevitable floor plan changes?
- Who is responsible for coordinating the working drawings with the project specifications?
- Are you using standardized details?
- Who is responsible for maintaining the detail library?
- Are your drawings adequately indexed to details?

Scope: Plan Your Drawing Layout

A good first step is to spend some time thinking about the finished set of construction documents. Do this before people begin writing specifications and drawing lines.

Lay out each sheet and determine the content and organization of each drawing.

- Determine major building sections and elevation layouts.
- Assign sheet numbers for you and your consultants.
- Standardize the format for detail and drawing sheets.

Resources: Schedule Personnel and Equipment

Once you determine the scope of your project, determine who will be working on the project and whether or not they will use the computer for part or all of their work. Here are some points to consider:

- Who is best qualified to work on this particular project? Have these people been trained on the computer?
- How well has the computer been integrated into your office? Have you already produced similar, but smaller, projects on your system?
- Are there certain parts of this project which, for the time being, would be better drawn manually, given employee experience and expected time of completion?
- How many computer workstations do you have? How many people are needed for this project? Do you have enough equipment to produce the project on the computer?
- How well developed is your database of previously drawn items? Are there large parts of this project which are similar to previously drawn projects? Can you make use of your template files to produce details and schedules?

  Remember, the principal advantage of CAD is to make efficient use of everything that has been previously drawn on the system. Your organizational expertise will determine the efficiency of the system.

Process: Plan the Project Development

As we have mentioned before, two points are key in producing a CAD project smoothly and efficiently:

- Managers and draftsmen must communicate with each other.
- Draftsmen produce drawings simultaneously.

When drawing with a CAD system, parts of one drawing become the "seeds" of other drawings. For example, the perimeter of the first floor plan is also the roof plan and the outline of the reflected ceiling plan. But this can't work well if the person drawing the perimeter of the first floor plan has cut openings in the walls before copying those walls to the roof plan drawing; no one wants a roof plan with windows in it.

This is a good illustration of the two points mentioned above. The manager needs to tell the draftsman which other drawings he should keep in mind and what is needed for those drawings, as the draftsman produces the first floor plan. And the draftsman should be encouraged to make other uses for his drawing as he goes along, uses which the project manager may not have thought of but which could save considerable drawing time.

This process will become more apparent in the sample project included in this chapter.

Ending a Drawing Session

When you finish working on a drawing, you can elect to save the changes you made or discard them. If you decide to save the changes, the drawing file is updated with the newest additions and modifications. If you decide to discard the changes, the drawing file is not updated and any new additions or modifications performed during the current work session are ignored.

Storing the Drawing

Saving your drawing allows you to retain the changes you made during the current work session. Although DataCAD's Autosave feature temporarily saves additions and changes to your drawing, these modifications are not permanent unless you direct DataCAD to update your drawing file using one of the following save methods.

Quick Save

Use this procedure to save changes to a drawing during your work session. You remain in the drawing after saving it. It is a good idea to save your drawing periodically and especially when you walk away from the computer or when you have made many changes.

To perform a quick save press [Shift]-[F] at any time during your work session.

Save the Current Drawing

1. Display the Utility menu.
2. Select FileI/O.
3. Select SaveDwg to make the changes permanent.
4. Select Exit to return to the drawing.

Save the Current Drawing and Load Another

Use this procedure to save any changes to the current drawing before loading another new or existing drawing.

1. Display the Utility menu.
2. Select FileI/O.
3. Select NewDwg.
4. Select Yes to save the current drawing and return to the Drawing Selection screen.
5. Select an existing drawing from the Menu Window or type the name of a new drawing at the user prompt in the Message Window. Use NewPath to select a different subdirectory if necessary.

Save the Current Drawing and Quit DataCAD

Use this procedure when you have finished your work session and want to save your drawing before exiting DataCAD.

1. Display the Utility menu.
2. Select Quit.
3. Select Yes to save the current drawing and exit to the system prompt.

Exit a Drawing Session

Leaving DataCAD involves ending your work session and exiting to the system prompt. Before quitting, you are asked to select whether you want to save any changes to your current drawing or abort them.

Sometimes, you will want to discard the changes you made to the current drawing. You may, for example, realize that you have made changes to the wrong drawing. When you ignore changes to a drawing, the status of the drawing reverts back to the last time it was permanently saved. If the drawing was a newly created drawing, all references to the drawing are erased.

Exit the Current Drawing and Load Another

Use this procedure when you want DataCAD to ignore the changes you made to the current drawing and load a new or different drawing.

1. Display the Utility menu.
2. Select FileI/O.
3. Select NewDwg.
4. Select Abort to discard all additions and changes to the current drawing.
5. Select Yes to confirm discarding changes and return to the Drawing Selection screen.
6. Select the new drawing name from the Menu Window or enter the name of a new drawing file at the user prompt in the Message Window.

Exit the Current Drawing and Quit DataCAD

Use this procedure when you have finished your work session and want to exit DataCAD without saving any of the changes to the current drawing.

1. Display the Utility menu.
2. Select Quit.
3. Select Abort.
4. Select Yes to discard the changes and return to the system prompt.

Quitting DataCAD Abnormally

Quitting DataCAD abnormally involves exiting the program because of a power interruption caused by an electrical failure, hardware problem or user error. When this occurs, DataCAD does not have the opportunity update the drawing file you were working on. This would generally mean that any modifications made to the drawing before the power was interrupted are lost. Fortunately, through DataCAD's Autosave feature, the temporary .asv file is not disturbed. This allows you to recover your drawing to the point of the last Autosave.

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Organizing a Drawing with DataCAD

Overview

Up to this point we have been considering what is necessary to produce the CAD project as a whole. Our advice has been directed toward project managers and partners. Let's now narrow our scope to producing an individual drawing on a single computer workstation. In doing so we will redirect our attention to the draftsman or designer who must actually draw the building.

Know All You Can Before You Draw

DataCAD is a tremendously flexible program in terms of allowing you to change what you have drawn, and undoubtedly much of your work on the system will be involved with altering drawings which are under design development. Nevertheless the more information you get right

the first time you draw something, the less time you will spend making revisions.

Unlike manual design development, which produces drawings by first sketching the rough idea of the object in mind, then gradually refining this idea into a drawing which is dimensionally and materially specific, Computer-Aided Design produces a drawing which is accurate the first time it is drawn. The drawing is accurate either to the right dimensions or to the wrong dimensions, depending on whether or not the draftsman knows the size of the building when he draws it.

This suggests that the ideal process of CAD development might be just the opposite of manual design development. Instead of starting from the idea of the building and moving down to the bricks, it might be better to start from the bricks and build them up into a building. In other words, if you first decide to construct the exterior walls of the building with 8" CMU, then *any* arrangement of those walls into a floor plan will have accurately drawn walls (important for automatic dimensioning). But, if you finalize your floor plan *before* you decide on the exterior wall construction, then in order to use automatic dimensioning, or in order to use my floor plan as a "seed" for wall sections and details, you would have to first *change* the thicknesses of *all* the walls you had drawn (in order to match the correct dimensions). This wall thickness change would in turn impact the interior dimensions of rooms and possibly affect the modular grids of ceiling and floor tile, lighting, etc.

Practically speaking, it would be impossible to predict the exact dimensions and materials of *everything* in the building before the design is finalized. A realizable goal, however, is to gather as much information as possible about the construction of the building before the design development or construction documents phases of the project begin. This will keep time-consuming changes to a minimum, and still allow the building to be drawn and dimensioned accurately.

You need to have as much information as possible on the following:

Scope of Work

How much needs to be drawn? In what detail? What information can be drawn once for several drawings?

Dimensions

What are the basic dimensions of the structural grid, columns, and load-bearing partitions? What size are the interior partitions? Doors and windows? Sill and jamb conditions? Floor and ceiling heights? Joist sizes?

Materials

What are the walls made of? What floor system are we using? Roof system? What is the foundation made of?

Previously Drawn Elements

Which typical details can be used for this project? Which templates are available to help me draw? Which drawings from the schematic design phase can be modified and reused? Which parts of my drawing can be used to create other drawings for this project?

Plan Your Drawing Layers

In computer-aided design, *layers* are the electronic equivalent of overlaid pieces of tracing paper that each contain a small part of the drawing information. The key to good CAD efficiency is a well-planned use of the almost unlimited number of drawing layers available to isolate related entities, details and text. There are several factors to consider in deciding how to organize layers.

Seed Layers

This term is used to describe any layer that may be used as a basis for subsequent layers. An example of this is the basic perimeter plan of a multi-story building. This plan might contain (on four layers, respectively) the perimeter and bearing walls, the columns, the column center lines, and the common core elements. These layers would be the seeds for the partitioning layout on the third floor, which in turn could become a reflected ceiling plan or HVAC layout for the third floor. Seed layers should be kept as generic and uncluttered as possible.

Refresh Time

The computer's speed determines the amount of time it takes to redraw all the entities displayed on the screen. Since you will be changing scales and views frequently, you will want to minimize the "system overhead" associated with this refresh. Only layers that are turned "ON" are processed for the refresh. If the layers are organized in such a way as to display only the essential information required for the drawing task, system overhead will be minimized. If you are working on a reflected ceiling plan, for example, there is no need to have site information displayed on the screen. Refresh time will also be affected by how much information you put on each layer. A drawing containing many layers of few entities each will refresh faster than one containing a few layers with many entities each. Thus it is better to have too many layers than too few.

Learn to use 2DViews with Layrset toggled on to simplify viewing and also automatically turn on and off layers required for the given drawing task.

Before you begin drawing, it is a good idea to sit down and make a list of all the layers you intend to create, noting what you expect each layer will contain. Although creating layers is easy with DataCAD, you will find it helpful to have a reference list as you draw to help you chart your drawing process. This way, when you get interrupted by six phone calls, you'll have an answer to the question, "What was I going to do next?"

This list will also be helpful in ordering your priorities as to what should be drawn first, second, third, etc., in order to make the most of your drawing information.

Know Where to Get Your Drawing Information

Just as your drawing can contribute to the drawings of others, what has already been drawn by others can help you. As you plan your drawing layers, make a note of where you can get some of the basic information needed for your particular task. There's no need to redraw all those toilets for the third floor if they've already been drawn for the first floor, or if you already have an appropriate toilet symbol on a plumbing template.

Prioritize Drawing Tasks

As well as making a list of all your layers, you may wish to make a *flow chart* of your drawing process; what to draw first, second, third, etc.

In order to keep drawing redundancy to a minimum, you will want to draw those parts of your drawing which are the most general first, then proceed to gradually detail your drawing until what was general becomes specific. Along the way you will make copies of certain parts of your drawing which can be used for other drawings.

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The process of drawing from the most general to the most specific is opposite the process of gathering information to prepare for drawing. You want to understand the building in the greatest detail possible before you draw it. But once you start drawing, you want to document all that information gradually, arriving at the most specific drawing (the detail) only after you have graphically described all the general conditions.

Draw As Few Entities As Possible

A drawing will, of necessity, contain many entities. The idea behind CAD is to have the computer automatically draw as many of those entities as possible. DataCAD incorporates several functions which make this automation possible.

Copy

Any entity, group, or area you draw can be copied one or several times automatically. Don't draw the same column fifty times! Draw it once and tell DataCAD to copy it fifty times for you.

Mirror

Any entity, group, or area you draw can be flipped and copied at once to produce a mirror image next to the original image. For example, you only need to draw one side of a corridor of rooms.

Symbols/Templates

Any entity, group, or area you draw can be stored in a template as a symbol. You can draw a tree once, save it as a symbol in a template, then dot trees all over your site plan just by touching all the places in your drawing where you want the trees to appear.

Line Types

Many material symbols shown in sections and details can be drawn automatically by selecting the proper line type, or by creating one of your own. There are built-in types for materials like insulation, brick, plywood, and roof shingles. You could produce, for example, a line of insulation running up a wall just by choosing the Insul line type and entering the two end points of the line.

There are two basic kinds of line types, user-defined line types and internally-defined line types. The four internally-defined line types are solid, dotted, dashed and dot-dash.

Know All The Tricks To Change What You've Done

Even the best laid plans of mice, men, and designers are subject to client review, and that means change. DataCAD provides you with many ways to modify anything you have drawn without having to redraw it. Here are some of these functions and tricks.

Stretch

Stretch lets you to surround any area or identify any point and move whatever you've selected to a new location, automatically stretching or shrinking everything attached to what you've decided to move. For example, you can move a window to a new place in the wall, and the wall will be automatically "fixed up" to match the new position of the window.

Change

Change lets you to alter the characteristics or "attributes" of any Entity, Group, Area or SelSets you've created. For example, you can change a wall from double-weight solid lines to single-weight dashed lines, alter its height from 8 feet to 10 feet, change its color from green to blue, etc.

Move

Move is different from Stretch in that only the Entities, Groups, SelSets or Areas you select are moved to a new location in the drawing; everything connected to those items stays where it is. So if you have two cased openings, one of which contains a door, you can move the door to the other cased opening, if necessary, without moving all the wall and jamb lines attached to the door.

Sample Project

This is an example of how to use DataCAD strategically; it is not intended to be a tutorial or replace DataCAD training.

Scope of Work

Summary of Known Information

Here is a summary of what is known about the building for which we will produce working drawings:

Description

A 40' x 80' speculative office building, three stories, flat roof, flat site, with parking for 25 cars.

Materials

Structure:

Steel column grid, 20' x 20' light weight steel floor and roof joists @ 2'-0" O.C.

Ext.Wall:

10" CMU foundation 4" brick veneer over 2" air space over 2x4 wood studs with 1/2" drywall.

Int.Wall:

2x4 wood studs with 1/2" drywall

Core:

Precast concrete stair, 8" CMU walls.

Dimensions

Plan:

40'-0" x 80'-0" on centerline of outer columns.

Elevation

First Floor @ 500.0'
First Floor Ceiling @ 510.0'
Second Floor @ 512.0'
Second Floor Ceiling @ 522.0'
Third Floor @ 524.0'
Third Floor Ceiling @ 534.0'
Top of Roof @ 536.0'
Top of Parapet @ 539.0'

Summary of Drawings Needed

Here is a list of items which will be required for this project:

Drawings

Site Plan
First Floor Plan
Second Floor Plan
Third Floor Plan
Roof Plan
Reflected Ceiling Plans
Four Exterior Elevations
North/South Building Section
East/West Building Section
Typical Wall Sections
Toilet Room Plans
Toilet Room Elevations
Lobby Elevation
Door, Window and Finish Schedules
Door and Window Types

Details

Summary of Available Personnel
Personnel
Job Captain
Draftsman 1
Draftsman 2

Summary of Available Equipment

Two Workstations:
CPU
Color Monitor
Keyboard Mouse
Additional Equipment
Digitizer
Printer
Plotter
Box of Floppy Disks

Job Captain's Development Plan

Planning the Drawing Time

1. Summarize drawings needed, plan final sheet layout.
2. Assign Draftsman 1 the task of developing plans on his workstation while Draftsman 2 finishes up another project.
3. When Draftsman 1 has the plans pretty well defined, give Draftsman 2 Draftsman 1's plan information. Have Draftsman 2 begin developing elevations and sections at his own workstation.
4. When plans, elevations, and sections have been developed, develop schedules and details on both workstations using completed drawings as a base for detail drawings.
5. When all drawings have been completed, assemble individual drawings into "sheets" for plotting.

How Draftsman 1 Drew the First Floor Plan

To chart the entire process of drawing this building would be too time consuming for our purposes here. Instead we will concentrate on two outlines which Draftsman 1 made when he was informed about the project, and given the task of drawing the first floor.

Draftsman 1 first spent some time with the Job Captain, learning what the project involved and how he would be contributing to the project. Then he sat down and prepared two outlines for himself:

1. An outline of all the layers on which he would be drawing.
2. An outline of his drawing process: what he would draw first, second, third, etc.

Draftsman 1's Layer Outline

Make a file which contains all the existing information about the project, and all the information likely to be used for other drawings. This will be the "seed" file.

Filename: 154A001.dc5

Layer Name	Description
TITLE	Title Sheet and Drawing Index
BORDER	Sheet Border with Title Block
SITE	Site Plan
TOPO	Original Topo Lines
UTIL	Existing and New Site Utilities
GRADE	Proposed Grade
FOOTPR	Basic Building Footprint
PERIM	First Floor Perimeter Plan
STRUCTR	Structural Columns
CORE	Core Elements (Stairs, Chases)
GRID	Column Grid

Make a file for the first floor plan drawing, which contains several SEED layers from the first file, including other detail layers.

File Name: 154a201.dc5

Layer Name	Description
BORDER	Sheet Border with Title Block
PERIM	First Floor Perimeter Plan
STRUCTR	Structural Columns
CORE	Core Elements (Stairs, Chases)
GRID	Column Grid
INTWAL1	Interior Partitions
LOBBY 1	Lobby Details
TOILET1	Toilet Details
LABELS1	Room Numbers, Labels
DIMENS1	Dimension Lines with Text
NOTES 1	First Floor Plan Notes
CEILNG1	Reflected Ceiling Plan

Draftsman 1's Drawing Process Outline

1. Create drawing file called 154a001.dc5.
2. Create and name drawing layers listed above.
3. Load sheet border from template file.
4. Input all existing site information.
5. Draw Columns, Column Grid, Perimeter, and Core on appropriate layers.
6. Separate drawing layers needed for first floor by saving them out to the hard disk on separate layer files. Name the layer files as follows:

Layer Name	**Layer Filename**
BORDER	154a001a.lyr
PERIM	154a001b.lyr
STRUCTR	154a001c.lyr
CORE	154a001d.lyr
GRID	154a001e.lyr

7. Create a detailed elevation drawing file called 154a301.dc5.
8. Create and name the drawing layers listed above.
9. Load basic first floor plan drawing layers from layer files listed above.
10. Draw interior partitions.
11. Merge perimeter and interior partitions onto CEILNG1 layer to prepare for reflected ceiling plan.
12. Place windows in perimeter wall.
13. Save modified PERIM layer out to disk on a layer file called 154a301a.lyr. (This layer will become the exterior wall for the second and third floors, which have identical windows to the first floor.)
14. Place doors in perimeter wall and in interior partition walls.
15. Window in on Lobby area and draw lobby details.
16. Window in on Toilet area and drawing details.

17. Draw reflected ceiling plan.
18. Add dimensions, labels, and notes to drawing.
19. Create a new detail elevation file for the Second Floor Plan called 154a302.dc5.

Summary

In summary, notice that Draftsman 1's outlines do not detail just how he will best draw every entity, group, or area for each part of the drawing. He knows this strategy will give him an outline of what to do next while leaving him free to choose the best drawing method for each part of his drawing. Undoubtedly he will use Copy, Mirror, and Stretch to produce, respectively, his column grid, two halves of a symmetrical parking layout, and one handicapped parking space which is larger than all the others. These are problems for which he will find solutions as he draws, therefore, we will not discuss those specifics here.

6

Hardware Setup

Overview

This chapter provides specific configuration information for plotters.

Plotter Configurations

The configuration parameters and settings for the supported plotters are provided as follows:

Calcomp

1040 GT Series including 1041, 1042, 1043, and 1044

DataCAD configuration parameters:

9600 Baud
No parity
8 bit word length

Cable Configuration:

No modifications are needed when using the CalComp supplied cable. The cable should be connected to the port marked DTE on the plotter.

DIP Switch Settings:

Bank	Bit Numbers (1=On, 0=Off)							
	1	2	3	4	5	6	7	8
S1	0	1	0	1	0	0	0	0

Set the plotter operating parameters as follows:

Duplex	Full
Parity	0
Bits/Char	8
Stop Bit	1
Clock	0 Int
Interface	0 Serial
Duplex	Full
Baud	9600
Mode	0 PCI
Term Muting	No
Checksum	Yes
Isochronous	No
End of Msg	03
Direct Cntrl	Yes
Xon/Xoff	No
Sync Codes	1
Sync Code Value	02

See your CalComp manual for instructions on checking and setting these parameters.

Hewlett Packard

HP-GL 7475, 7550, 7580, 7585

DataCAD configuration parameters:

9600 Baud
No parity
8 bit word length

Cable Configuration:

Computer End (25 Pin)	Plotter End (25 Pin)	Computer End (9 Pin)
3	2	2
2	3	3
7	7	5
4 5	4 5	7 8
6 20	6 20	6 4

On Model 7580 and 7585, set the following plotter parameters:

Parity	Even
Eavesdrop\Standalone	Standalone
Emulate\Normal	Normal
Expand\Normal	Normal
Hardware\Modem	Modem
Monitor\Normal	Normal
Local\Normal	Normal
DTR Bypass\Normal	Normal

On Models 7550, set the following plotter parameters:

Monitor Mode	Off
Remote Mode	On
Standalone Mode	On
Xon\Xoff	On
Direct Mode	On
Full Duplex	On
8 Bit word length	
Parity	Even
No Parity	

Hewlett Packard

DraftPro and ColorPro

DataCAD configuration parameters:

9600 Baud
No parity
8 bit word length

Cable Configuration:

```
Computer End        Plotter End         Computer End
(25 Pin)            (25 Pin)            (9 Pin)

 3--------------------2-------------------- 2

 2--------------------3-------------------- 3

 7--------------------7-------------------- 5

┌5------------------20------------------ ┌8
└6                                       └6

20--------------------5-------------------- 4
                      └6
```

DIP Switch Settings:

The DIP switches for DraftPro should be set as follows:

0	Off
1	On
2	Off
3	On
4	Off
5	Off
6	Off
7	On
8	Off
9	Off
10	Off
11	Off

Configure the DraftPro as a large D or E size Hewlett Packard plotter in the DataCAD configuration program.

The DIP switches for ColorPro should be set as follows:

B1	0
B2	1
B3	0
B4	1
US	1
S1	0
S2	0

Configure the ColorPro as a small A to C size Hewlett Packard plotter in the DataCAD configuration program.

Houston Instruments

DMP including 41, 42, 51, 52, 56 and all MP series.

DataCAD configuration parameters:

9600 Baud
No parity
8 bit word length

Cable Configuration:

No modifications are needed when using the Houston Instruments supplied cable.

or

```
Computer End      Plotter End       Computer End
(25 Pin)          (25 Pin)          (9 Pin)

  3---------------------2--------------------- 2

  2---------------------3--------------------- 3

  7---------------------7--------------------- 5

 ┌4                                          ┌7
 [                                           [
 └5                                          └8

 ┌6                                          ┌6
 [                                           [
 └20                                         └4
```

Numonics

5624

DataCAD configuration parameters:

9600 Baud
Even parity
7 bit word length

Cable Configuration:

Computer End (25 Pin)	Plotter End (25 Pin)	Computer End (9 Pin)
3	2	2
2	3	3
7	7	5
┌4 └5	┌4 └5	┌7 └8
┌6 └20		┌6 └4

DIP Switch Settings:

Numonics Serial Interface Card

Block	Bit Numbers (1=On, 0=Off)							
	1	2	3	4	5	6	7	8
S1	1	1	1	0	1	1	1	0
S2	1	1	0	0	0	1	1	0
S3	0	0	0	0	0	1	0	0

Roland

RD-GL

DataCAD configuration parameters:

9600 Baud
No Parity
8 bit word length

Cable Configuration:

Computer End (25 Pin)	Plotter End (25 Pin)	Computer End (9 Pin)
3	2	2
2	3	3
7	7	5
┌4 └5	┌4 └5	┌7 └8
┌6 └20	┌6 └20	┌6 └4

7

Appendix

Questions and Answers

This appendix lists some of the common questions that you may have while working with DataCAD, and provides answers.

Keyboard Angles

How do I enter a line 24'-5 1/8" at an angle of 30° 42' in DataCAD?

Use the keyboard entry feature. After entering the first point of a line with the mouse, press Spacebar. DataCAD prompts you for the relative distance. If you are using Architectural units (feet-inches-fractions) enter 24' 5 1/8" by typing 24.5.1/8, and press ↵. DataCAD then asks for the relative angle. To enter an angle of 30° 42', type 30.42, and press ↵. The relative angle establishes the direction of the line entered.

Coordinate Systems

Which coordinate systems does DataCAD support?

DataCAD allows operations in four coordinate systems: relative polar, absolute polar, relative cartesian, and absolute cartesian. Under the default, relative polar, points are defined as a distance from the last point entered at a specified angle. Absolute polar calculates points similarly from absolute zero. Absolute zero defaults to the lower left corner of the screen, but can be set in the Settings menu by selecting FixdRef. In relative cartesian, points are defined as an X,Y distance from the last point entered. Absolute cartesian calculates points as an X,Y distance from absolute zero. In DataCAD coordinate systems can be changed anytime simply by pressing Ins to scroll through the list, or pressing Shft-Ins to scroll backwards.

Defining Scales

Can I define my own scales in DataCAD?

Yes. DataCAD allows up to eighteen scales to be displayed on the menu at any time, all of which are user-definable. To change one of the scales provided with the program, select Scales from the EditDefs submenu which is located in the Settings menu. Further information on changing the scale values is provided in the "Settings" section of the "Utility Menu" chapter in the *DataCAD Reference Manual.*

.ASV/.SWP/.BAK

What is the purpose of the .asv, .swp, and the .bak files?

An .asv file is the automatic save drawing file that is created when the program does an automatic save during the work session. This file is usually a temporary file that is erased by the program when you exit a work session. However, the file is saved to the hard disk if there is a power failure or if the system requires rebooting during a work session. The steps needed to recover this file are explained in the "System Structure" chapter of this manual.

A .swp file is a temporary swap file that is created when you enter DataCAD and is the working file that contains your drawing during a work session. This working file is transferred to your drawing file .dc5 when you exit DataCAD.

A .bak file is the backup file that is a copy of the drawing as it existed at the end of the previous work session. The backup file exists should you do something regrettable to your current drawing file and desire to return to the previous version of your drawing. The steps needed to convert this file into a drawing file are explained in the "System Structure" chapter of this manual.

LyrSrch

What should I do when I get the message 'The point entered is too far from an entity'?

You will get this message when selecting entities, groups, or areas that are located on layers other than the currently active layer. You may avoid this message by using Identify to check the layer of the entity you are selecting, and then pressing Tab to scroll to that layer. Another way to avoid this message is by toggling LyrSrch on (located in most Edit submenus).

Automatic Saving

How can I change how often DataCAD performs the automatic save function during a work session?

Select SaveDlay in the Settings menu and enter the desired interval in minutes. A setting of zero will turn off the automatic save feature. We strongly recommend using the automatic save feature, however, to provide a current version of your drawing file should you encounter a power failure, or a software or hardware problem.

Drawing Size Reduction

How do I reduce a drawing file (.dc5) after substantial deletions to free up hard disk space?

Save out each layer of the drawing file as a layer file, and load them into a new drawing file. The new drawing file size will reflect the actual amount of information currently contained in the drawing, not the previous file size. After loading the layers into the new drawing file, delete the old layer files and the original drawing file from your hard disk to take advantage of the disk space made available by the reduced drawing file size. This process can be greatly accelerated by using the LyrUtil macro. See the "Macros" chapter in the *DataCAD Desktop Tools Manual* for further instructions.

DXF

How do I use the DXF read/write portion of DataCAD?

First, go to the FileI/O menu of DataCAD. To write the current drawing file to DXF format select WriteDXF. You are asked for the name of the file to write to. DataCAD suggests the same name as the present drawing. If this is satisfactory, press ↵. If not, type in a name, and press ↵. To whatever name you choose, DataCAD adds the file extension .dxf. The drawing is then written to the file in DXF format. It is important that DataCAD associative dimensions first be exploded, using the Explode command in the Dimension menu, before using WriteDXF to retain dimensions in the DXF file.

To read a file that is in DXF format, select ReadDXF. A list of names of available DXF files should appear in the menu window. If not, the path may be set wrong. Select NewPath, and enter the correct path to the directory where your DXF files are kept. Pick the name of the file to read from the menu. DataCAD reads the file and displays it on the screen.

I was writing to a DXF file when DataCAD displayed the message, "Invalid AutoCAD layer name." What does this mean?

AutoCAD insists that layer names be in all uppercase letters. Notice that DataCAD suggests a new name for the layer which is the same as the original name, but is all uppercase. If this acceptable, press ↵, otherwise type in the layer name you prefer.

AutoCAD Transfer

Will everything from the AutoCAD drawing be reproduced in DataCAD?

No. Only entities that DataCAD recognizes will be read into the new drawing. For example, DataCAD does not use polylines so it will not read these lines into the new drawing; the polylines become single line segments between the vertices. Block attributes in AutoCAD will transfer as lines of text in DataCAD.

Program Speed

How can I speed up DataCAD?

A fast graphics card and a high computer clock speed will obviously increase the speed of program execution. Many hardware expenditures, however, may not be required to gain substantial increase in speed. With DataCAD, substantial swapping of information occurs between RAM and the virtual file as you invoke various commands. The speed of execution is often limited by the access time of the hard disk. As access time for a RAM disk is often 20-30% lower, locating the virtual file on a RAM board addressed as a RAM disk will significantly reduce the amount of time required to access drawing file information. If you choose to locate your virtual file on a RAM board addressed as a RAM disk, you will need enough RAM in excess of 640KB to contain your largest drawing file once. Upon installing the required memory chips, and addressing the RAM board as a RAM disk, simply enter the path name to the RAM disk for the virtual file in the DataCAD configuration program. As the virtual file, dcad.swp, is created each time a drawing file is entered, and deleted after exiting, no files need to be copied to the RAM disk. Also Memory Managers which load Terminate and Stay Resident (TSR) programs into high memory can also speed up the program.

Also, be sure to check the many settings in DataCAD which may make your refresh speed increase. For example, text can be turned off, SymblText may be set to five pixels, and displayed hatch patterns may be turned off.

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